Forensic Podiatry and Gait Analysis

There is growing interest in this sub-specialty.

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Forensic podiatry was first used in the 1970s, and since then it has developed exponentially as it began to be accepted by mainstream forensic science (DiMaggio & Vernon, 2017). The criminal justice system has spearheaded and validated the usefulness of forensic podiatry by utilizing the science behind footprint and gait analyzation during crime scene investigations. Forensic Podiatry is the study of the examination of foot-related evidence in the context of criminal investigation; areas of study include the feet, lower limb anatomy, musculoskeletal functions, deformities and diseases of the foot (DiMaggio & Vernon, 2017). Due to a podiatrist's extensive knowledge and experience with the entire spectrum of pedal issues, his/her knowledge aids in proving the association of an individual with a crime scene, and it answers further questions concerning the prints of the foot and footwear.

Typically, podiatrists focus on footprint analysis, shoe-type imprints and gait analysis. Shoe imprints and gait analysis are mainly used to analyze a crime scene and establish personal identity. Footprint identification wasn't always a focal point in crime scene investigation; but due to the uniqueness of each individual, a footprint can be used as a broad indicator of the suspect's features (DiMaggio & Vernon, 2017). Those features may include a person's height, weight, possible gender, type of shoe, and much more. Lower extremity experts have been increasingly called on to assist with crime scene investigations by viewing footage of criminals, in which they can investigate their walk, footprints, and specific footwear (Pal, 2017). Gait analyses focuses on class characteristics, which are features that show stance, swing phases, long or short steps, signs of pathology, and so a multitude of other characteristics (Pal, 2017).

Areas of Practice

Footprints are considered a significant aspect of the investigation that is usually deemed as "missed evidence". Crime scene movements are reconstructed with footprints in order to properly analyze all traction within the scene. The areas of forensic podiatry that assist in revealing the identity of the print involve the analysis and interpretation of gait analysis, bare footprints, and shoeprints. These areas can help determine the specific number of individuals present depending upon the number of foot impressions found. In the case of multiple footprint types, the investigator may be able to provide insight based on the perpetrators personal gait movements or style of walking to the prints on the scene.

Footprints

Footprints have been proven to be unique to each individual as the odds of a chance match for a print in the general public are 1 in 1.28 billion. Furthermore, the appearance of a foot print involves several steps to ensure its accuracy for analysis and identification. Footprints are not readily apparent at a crime scene as they may be on tables, rugs, or on the victims themselves. Examining surfaces with oblique lighting, chemicals, or electrostatic detector devices make the prints more visible. The process of documenting the footprint involves clear photography, measurements, and positioning lights at oblique angles to enhance visibility and distinct features. Bare footprints are measured in

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both static and dynamic prints. Static information is collected by comparing values for three parameters of the Stahelis Arch Index, Chippaux-Smirak Index, and Footprint Angle.

Footwear in terms of the type of shoe, size, and patterns is significant evidence to help determine various aspects of the crime scene, the individuals present, and the suspect's point of entry, or direction of travel. The size and width of the foot can help determine the height of the suspect, thus narrowing the characteristics needed to pinpoint the suspect. Unique characteristics such as style, manufacture markings, defects, and wear patterns are also critical in determining where the shoe was bought, who bought it, and how long ago.

DUI Gait Analysis

In terms of driving under the influence (DUI), forensic podiatry helps determine whether the individual's walk is due to intoxication, or because of any personal body disorder. This eliminates any assumptions or false accusations of an individual being under the influence due to their odd walk. Gait analysis is often analyzed through a piece of video surveillance which portrays the unique and distinct features of the suspect's walk or run. Gait analysis usually covers the examination of the gait forms of persons captured on closed circuit television [CCTV], but also covers the analysis of the sequences of footprints at a crime scene (DiMaggio & Vernon, 2017).

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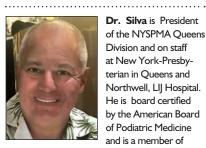
Conclusion

For decades, criminal investigators and forensic scientists have turned to fingerprints to determine identity. More recently, however, footprints have been discovered to be as equally or even more reliable as an identifier. It is common for suspects to cover their hands and head to eliminate any evidence of them, but they do not take their footprints and movements into consideration. Due to the highly specialized nature of forensic podiatry, the number of podiatrists practicing forensic identification had been limited, but through recent developments and practice, there has been rapidly increasing interest. **PM**

References

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