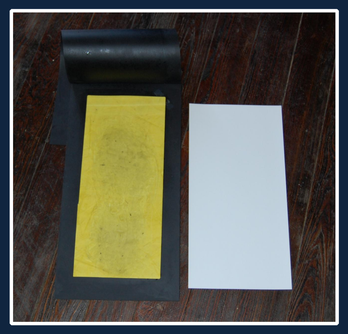
Outsole Frequency Study of Suspect Shoe Impressions Compared to a Student Population

Jamie Johnson, BS*, Dr. Pamela Staton, PhD, Kerrie Cathcart, MSFS
Marshall University, Huntington, WV 25701
Forensic Science Program

Abstract

The more frequent a shoe is in a given population means that there will be a larger suspect pool when making comparisons, as a greater number of shoes will share class characteristics. The purpose of this research was to determine the outsole frequency of suspect shoe impressions (from law enforcement agencies) compared to a student population (taken using the Identicator® LE-25 Inkless Foot/Shoe Print kit). The most frequent shoe among students was an Old Navy flip-flop, while the most frequent suspect shoe was a Nike Air Force 1. Based on this data, the frequency study should be done year-round. A general population frequency study should also be attempted to help link the two populations together.



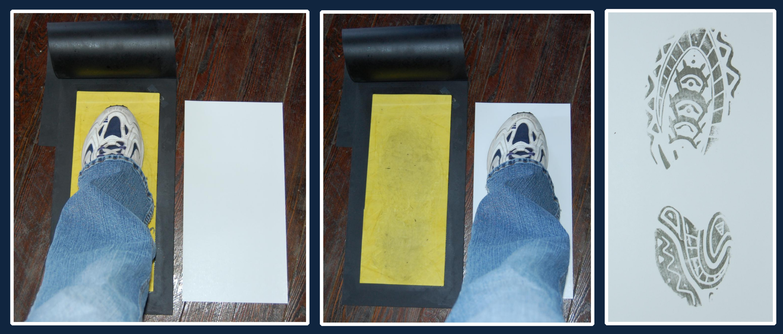
Introduction

Impression evidence is defined as objects or materials that have retained the characteristics of other objects or materials that have been impressed against them. Types of impressions include fingerprints, palm prints, glove prints, tire impressions, footwear impressions, footprints, sock impressions, bite marks, lip impressions, ear impressions, and contusion and abrasion patterns. Footwear impressions, like any other type of evidence, should not be overlooked especially since an unknown shoe impression can be positively identified to the known shoe from which it was made, and it carries the same weight as one fingerprint being positively identified to another fingerprint. Numerous impressions can help determine the number of suspects, their travel throughout the crime scene, their participation in the crime, and what actually happened during the crime. They can also help prove or disprove witness statements. A single footwear impression can possibly give information about make, model, type, description, and approximate size of the shoe [1-3].

When referring to specific parts of a shoe, an outsole is the bottom part of the shoe that touches the ground. This is what is used when making test impressions. Test impressions of shoes have to be taken before any attempt at comparison can be made between the known and questioned shoe. These impressions are done to document the current characteristics found in a shoe. These characteristics include wear characteristics (changes in the outsole due to its wearing away), class characteristics (size in length and width, shape, make, model, and outsole design), and individual characteristics (randomly added to or taken away from an outsole, making it unique) [1-3].

Materials and Methods

- Identicator® LE-25 Inkless Foot/Shoe Print kit
- 7” x 14” chemically-treated paper
- Suspect shoe impressions obtained from International Association for Identification (IAI) Certified Footwear Examiners
- Shoe impressions required a place to dry but can be stored anywhere
- Test subject filled out brief, voluntary, and anonymous survey about themselves and shoe
- Shoe questions: make, model, size, how old it is, how often it is worn, and whether or not it is counterfeit
- Personal questions: sex, height, and weight
- Shoe impression taken by stepping on inkless pad and then onto chemically-treated paper.



Results

Make	63/409 (15.4%) Nike
Shoe (Make & Model)	31/409 (7.6%) Old Navy flip-flop
Size	Female: 34/215 (15.8%) size 8 Male: 35/176 (19.9%) size 12
Sex	Female: 223/405 (55.1%) Male: 182/405 (44.9%)
Height	Female average: 5’5” Male average: 5’10.5”
Weight	Female average: 152 lbs. Male average: 188 lbs.
Age of shoe	1 day – 12 years (no avg. determined)
How often shoe is worn	No avg. determined
Knockoff	Yes: 24/392 (6.4%) No: 368/392 (93.9%)

Table 1: Results of student shoe impressions.

Make	136/390 (34.9%) Nike
Shoe (Make & Model)	32/390 (8.2%) Nike Air Force 1
Size	Female: 3/6 (50.0%) size 8 Male: 33/282 (11.7%) sizes 10 & 12
Sex	Female: 7/332 (2.1%) Male: 325/332 (97.9%)

Table 2: Results of suspect shoe impressions.

Discussion

For student impressions, Nike was by far the most frequent make, but the models varied considerably and a specific Nike shoe was not determined to be the most frequent. The Old Navy flip-flop was determined to be the most frequent due to the consistency of the model. The reason no average could be found for age of the shoe or how often it is worn was due to the data being qualitative instead of quantitative.

For suspect impressions, Nike was by far the most frequent make again. The most noticeable difference between the student study and the suspect study is the number of males and females. There were only seven females total in the suspect study, so the data shows that the majority of suspects are male.

Conclusion

The frequency study of suspect shoe impressions compared to a student population showed that the most frequent student shoe is the Old Navy flip-flop, and the most frequent suspect shoe is the Nike Air Force 1. Knowing how frequent a particular shoe is in a given population is important in determining how large a suspect pool might be. The more popular a shoe is, the larger the suspect pool will be. Additionally, there will be a greater number of shoes that share class characteristics, and this could affect the conclusion made by the footwear examiner. In the future, the research should be done year-round so the data obtained is not season-dependent. This is likely the main reason that the Old Navy flip-flop was found to be most popular based on current data. It would also be beneficial to do a general population frequency study to see how the three relate.

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