Forensic Science: Prints

Before Fingerprints

Will West
Now Wait a Minute

William West

The Tale of the Tape

<table>
<thead>
<tr>
<th></th>
<th>Will West</th>
<th>William West</th>
</tr>
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<tbody>
<tr>
<td>Body Height</td>
<td>178.5 cm</td>
<td>177.5 cm</td>
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<tr>
<td>Reach</td>
<td>187</td>
<td>188</td>
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<tr>
<td>Trunk Height</td>
<td>91.2</td>
<td>91.3</td>
</tr>
<tr>
<td>Width of Head</td>
<td>19.7</td>
<td>19.8</td>
</tr>
<tr>
<td>Length of Head</td>
<td>15.8</td>
<td>15.9</td>
</tr>
<tr>
<td>Length of Right Ear</td>
<td>14.8</td>
<td>14.8</td>
</tr>
<tr>
<td>Width of Right Ear</td>
<td>6.6</td>
<td>6.5</td>
</tr>
<tr>
<td>Length of Left Foot</td>
<td>28.2</td>
<td>27.5</td>
</tr>
<tr>
<td>Length of Left Middle Finger</td>
<td>12.3</td>
<td>12.2</td>
</tr>
<tr>
<td>Length of Left Little Finger</td>
<td>9.7</td>
<td>9.6</td>
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</table>
Why Do We Have Fingerprints?

Dermal Papillae

- A fingerprint will remain unchanged during an individual’s lifetime.
- A fingerprint is unique due to minutiae.
- Fingerprints have general characteristics ridge patterns that permit them to be systematically classified.

Ridges

Fundamental Principles of Fingerprints
Loop

A loop must have one or more ridges entering and exiting from the same side it began. Loops must have one delta.

Types

- Radial—opens toward the thumb
- Ulnar—opens toward the “pinky” (little finger)

Whorl

A plain or central pocket whorl have at least one ridge that makes a complete circuit. A double loop is made of two loops and an accidental is not covered by other categories.

Types

- Plain
- Central Pocket
- Double Loop
- Accidental

Whorls (con’t.)

Accidental Whorl

Double Loop Whorl
Arch

An arch has friction ridges that enter on one side of the finger and cross to the other side while rising upward in the middle. They do NOT have type lines, deltas, or cores.

Types
- Plain
- Tented

Comparison 1

Arrested 08-31-89

Comparison 2

Arrested 05-26-99
Comparison 3

Side-by-side Comparison

Comparison 4

Comparison of minutae points

Comparison 5

Points Labeled for Comparison
Print Comparison

Fingerprints

- **Visible**
  - Blood, paint, grease, ink...

- **Plastic**
  - Soap, putty, clay...

- **Latent**
  - Invisible to unaided eye

Why Do We Leave Latent Prints?

- **Latent** fingerprints are those that are hidden and are not visible to the naked eye.
- **Most secretions** come from three glands:
  - Eccrine—largely water with both inorganic and organic contaminants (salts)
  - Apocrine—secrete cytoplasm and nuclear materials
  - Sebaceous—secrete fatty or greasy substances.
Developing Latent Prints

- **Powders**—adhere to both water and fatty deposits.
- Choose a color to contrast the background.
- **Iodine**—fumes react with oils and fats to produce a temporary yellow brown reaction.

Iodine Fingerprint

Developing Latent Prints (cont)

- **Ninhydrin**—reacts with amino acids to produce a purple reaction.
- **Cyanoacrylate**—“super glue” fumes react with water and other fingerprint constituents to form a hard, white deposit.
Ninhydrin Fingerprint

Cyanoacrylate Fingerprints

Other Prints
- Ears—shape, length and width
- Face—pictures being used in Florida to find criminals
- Voice—electronic pulses measured on a spectrograph
- Feet—size of foot and toes; lines of the feet
- Shoes—can be compared and identified by type of shoe, brand, size and year of purchase
Other Prints

**Palm**—lines can be identified and may be used against suspects.

Other Prints

**Foot Prints** are taken at birth as a means of identification for infants.

Other Prints

**Lips**—display one of five common patterns:
- Short vertical lines
- Long vertical lines
- Rectangular lines that may crisscross
- Diamond
- Branching
Other Prints

**Teeth**—bite marks are unique and can be used to identify suspects.

Other Prints

The blood vessel patterns may be unique to individuals. They are used for today's various security purposes.