Unit 4 – Part One Tool Marks

Introduction
- ________ ________—any impression, abrasion, or cut made when contact occurs between a tool and an object
  - An example of ____________ evidence
  - Even mass-produced tools have minor differences
  - The impressions ______ _______ the tool to a __________ _______ and potentially to the owner

Tools and Crime Scenes
- Tools:
  - increase our ability to handle manual tasks, but
  - can also be used in crimes
- How can a tool used in a crime lead investigators to the criminal?
- Why is ownership of a tool used in a crime circumstantial evidence?

Tool Mark Impressions
- ________ Marks
  - Result when a tool is __________ against a softer surface
  - Tools usually leave ________________ marks
  - The ____________ of a tool influences the ________________ ________ left in the softer object
  - May indicate the ________ of the tool used in a crime

- ________ Marks
  - An object’s surface can be __________ or ________ away by a tool
  - The ____________ object causes abrasions on the ________________ surface
  - Indentation and abrasion marks sometimes occur at the same time

- ________ Marks
  - Edged instruments can penetrate a softer object and separate it into parts
  - ______ _______ are produced along the edge as a surface is cut
Tool Mark Impressions

Examples of Cut Marks on Bones

<table>
<thead>
<tr>
<th>Tool</th>
<th>Characteristics</th>
<th>Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stryker</td>
<td>Circular areas of short radius; some overlapping marks</td>
<td>Few teeth marks</td>
</tr>
<tr>
<td>Band saw</td>
<td>Very smooth cut</td>
<td>Few teeth marks; straight fine cut; seldom overlapping marks</td>
</tr>
<tr>
<td>Hack saw</td>
<td>Overlapping marks</td>
<td>Tiny tic-tac-toe board look with thousands of squares</td>
</tr>
<tr>
<td>Chain saw</td>
<td>Blade goes directly through bone; messy cut</td>
<td>Roughened edge</td>
</tr>
<tr>
<td>Table saw</td>
<td>Parallel, curved striations</td>
<td>Ridge grooves</td>
</tr>
</tbody>
</table>

Tool Mark Examination

- Some experts specialize in tool mark investigations
- Evidence can include:
  - tool marks at the scene
  - the tool if left behind

Documenting the Evidence

- ______ tool mark evidence when possible
- ______ the evidence with a measuring device to show scale
- Measure the _____ of the ____________
- ______ preserve tool mark impressions
  - silicone or rubber-based casting materials
- Cast impressions retain the ____________ marks made by a specific tool
- Take pictures and dust for fingerprints before applying casting material
  - Use ____________ ____________ ____________ and silicone material
- The size of the impression should be measured and recorded.

Collecting and Preserving a Sample

- Correctly ______ evidence
- Wrap small objects with clean paper and place them in small containers or plastic bags
- Pack large objects in cartons or boxes
- Record—who, where, when, and why

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**Analyzing Tool Mark Evidence**

- Laboratory tool mark analysis identifies:
  - major ____________ defining the type of tool used in a crime
  - _______ characteristics that might distinguish between the same kinds of tools
- Forensic comparison microscopes examine tool mark characteristics that match a suspect tool

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**New Technology in Tool Mark Identification**

_________ now require more than visual pattern comparisons

- ___________________________ (with images acquired by forensic comparison microscopes)
- Algorithms to statistically analyze tool mark patterns
- Scanning tools measure the depth or height of tool marks and make a ___________ ______
- Same techniques used for ballistics/firearms examinations

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**Tool Mark Evidence in the Courtroom**

- The tool mark witness prepares a written report to present to a jury.
- When available, provide:
  - Original evidence
  - Castings
  - Magnified images of tool mark comparisons
- Such evidence may link a series of crimes