The Shattered Clue: Evaluating Glass Fractures at a Burglary Crime Scene

Case Overview:

A local jewelry store was broken into late at night. The front glass window was shattered, and many high-value items were stolen. Forensic investigators were called to the scene to determine the method of entry and to collect potential evidence from the broken glass. The main question was whether the window was broken from the inside or the outside, and if any clues could be gleaned from the glass fracture patterns.

Crime Scene:

The scene involved a large plate glass window that was found broken in the front of the store. The store's security footage failed to capture clear images of the event due to technical issues. Investigators focused on examining the glass shards both inside and outside the store.

Objectives:

- Determine the direction of force applied to the glass window.
- Identify the type of glass and characteristics of the fracture pattern.
- Evaluate whether any glass fragments can lead to identifying suspects or reconstructing the events.

Evidence Collected:

1. **Glass Fragments**: Shards of glass were collected from both inside and outside the store.
2. **Tool Marks**: Investigators identified potential tool marks on the window frame, suggesting the possible use of a blunt object.
3. **Photographs of Glass Fractures**: High-resolution images of the radial and concentric fracture patterns were taken for forensic analysis.
4. **Surrounding Materials**: Items such as pieces of clothing, hair, and fibers were collected near the window and could have come from the perpetrator.

Forensic Examination:

1. **Analysis of Fracture Patterns**:
    - **Radial Fractures**: These are lines that extended outward from the point of impact, suggesting the glass was broken by an object striking it.
    - **Concentric Fractures**: Circular fractures formed around the point of impact, which are typically a result of the glass flexing under pressure. The investigators analyzed these patterns to determine the force applied and the direction.
2. **Direction of Force**:
    - The fracture patterns indicated that the glass was broken from the outside. This was determined by examining the presence of **radial fractures**, which were longer on the outside of the glass.

    - Additionally, small flakes of glass on the inside of the store suggested the glass had broken outward, confirming an external break.
3. **Type of Glass**:
    - The glass used in the window was found to be **tempered glass**, which tends to break into smaller, cube-shaped pieces. This was consistent with the pattern of fragments found inside the store.
4. **Tool Mark Analysis**:
    - The tool marks on the window frame matched the shape of a crowbar, which was later found in a nearby alley. The pattern on the tool's surface corresponded to the impressions left on the window's frame, further suggesting it was used in the break-in.

Photographic Evidence:

Investigators took several photographs of the fractured glass to assist in their analysis. Below is a detailed breakdown of the key findings:

- **Photo 1**: Shows the point of impact, with clear radial fractures extending outward from the center. The impact point indicates the object hit the glass at a high velocity.
- **Photo 2**: Displays concentric rings forming around the impact site, suggesting that a significant amount of force was applied. These patterns helped confirm the window was broken from the outside.
- **Photo 3**: Highlights the tool marks on the window frame and the edges of the glass where the crowbar may have been used.

Conclusion:

Through the evaluation of glass fracture patterns and tool marks, investigators concluded that the window was broken from the outside using a crowbar. The direction of force and fracture patterns were consistent with a forced entry. The identification of tempered glass and matching tool marks helped build a solid case against the perpetrator, who was later arrested with items matching those stolen from the store.

Figure 1

Figure 2

Figure 3