F53   Using GNU Image Manipulation Program (GIMP) to Fabricate Bitemark Overlays

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After attending this presentation, attendees will understand the availability and utility of the GNU Image Manipulation Program (GIMP) and appreciate the simplicity of using it to fabricate bitemark overlays.

This presentation will impact the forensic science community by demonstrating a simple, low-cost method of producing bitemark overlays.

Bitemark analysis is the process of studying a pattern to determine if it is a bite and then establishing the mechanism of its production. Food and skin are some of the common places bitemarks can be encountered. Human bitemarks on skin are the most common type of forensic bitemark case. Human bitemarks can be divided into adult and child groups.

The biter may be human, animal, or insect. Inanimate objects such as a pipe in cross-section or electrocardiogram pads may cause wounds that are very similar in size and appearance to human bitemarks.

Some foodstuffs are excellent in their ability to record an imprint of the dentition but over time lose dimensional fidelity due to dehydration. Human skin's ability to hold an imprint of the inflicting dentition is compromised by rebound and elasticity but is enhanced by the color shift due to contusion and to surface alteration. Bitemarks on living skin are lost to healing while those on a decedent are subject to decomposition.

Various methods exist to compare a dentition to a pattern. Currently, one of the most widely used methods is the overlay. Use of an overlay allows a graphical description of the relationship of the teeth to the wound. A computer with image manipulation software is used to fabricate the overlay. The method described here minimizes the amount of operator induced error, bias and subjectivity.

GNU Image Manipulation Program (GIMP) is an image retouching and editing tool and has been released as free and open source software. There are versions tailored for most operating systems including Microsoft® Windows®, OS X®, and Linux®.

GIMP has tools that are used for image retouching and editing, free-form drawing, resizing, cropping, photo-montages, converting between different image formats, and more specialized tasks. The developers and maintainers of GIMP strives for it to be a free, high-end software graphics application for the editing and creation of original images, photos, icons, graphical elements of web pages and art for user-interface elements. GIMP is available free and can be downloaded at http://www.gimp.org/downloads/. The download is 77MB and user's manual of 25MB is available in many languages. Ubiquitous help is available by using the Google® search tool. Once the download has been completed and GIMP has been installed on your computer, the GIMP icon can be double-clicked to start GIMP.

When GIMP is first started, three panels will be displayed: the main canvas; a toolbox panel and a panel with layers, undo; and, several other dialogs. A menu bar with access to several menus is displayed across the top of the main canvas.

Models of the dentition of interest are scanned and imported into GIMP. The models are scanned in the grayscale mode and the overlay is generated by using the threshold and stroke tools.

The overlay should be inscribed with pertinent information such as date, name of suspect, upper or lower, case number, etc. An inscription such as "this side down" is placed to ensure that the left-right orientation of the overlay is correct when in use. The image is now printed. A sheet of clear transparency paper is used for the actual overlay; the overlay image can also be printed on regular white paper for inclusion in a report. The image is saved as a GIMP XCF file to preserve the layers and the overlay is also exported as a JPG file.

Bitemark, Computers, Overlay