F4 Use of UV LED Light as a Tool in the Forensic Dental Examination of Unidentified Human Remains

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The goal of this presentation is to highlight the value of inexpensive, portable UV LED lights in determining the presence of composite restorations during the forensic dental examination.

This presentation will impact the forensic science community by demonstrating how the use of these small and inexpensive UV LED lights can make the presence of tooth colored restorations more easily detected by the examining forensic dentist.

According to the American Dental Association, the number of posterior composite resin restorations placed by all private practitioners in 1990 was estimated to be 13,860,000. By 1999 that number had increased by over 300% to 46,116,000. The decrease in the use of amalgam as a dental restorative material for posterior teeth and the significant increase in the use of composite resin in posterior teeth will undoubtedly complicate the forensic identification of unknown human remains.

The increase can be attributed to the fact that dentists are doing more conservative restorations; the adhesives that bond the composite to the dentin and enamel are producing higher bond strengths. Color stability, and wear resistance have been improved. Patients are more aware that there are "white fillings" available and they are requesting them.

Determining the presence of an amalgam restoration during the postmortem clinical examination, even in dentitions involved in fires is relatively easy. Because the shade of the composite restoration often matches the tooth so closely it can be overlooked during the postmortem examination. Complicating this is the fact that the forensic odontologist may be performing an identification in a location that he or she is not familiar with such as a funeral home, a temporary morgue, in a tent, or warehouse where the available lighting may make visualization more difficult and the ability to thoroughly clean the dentition may be limited.

The use of UV lights to detect the fluorescent properties of composite resins is known. The use of battery operated small UV LED lights in forensic odontology is relatively new. This case will demonstrate to forensic odontologists the value of these lights.

The partially decomposed remains of an adult male was found by hikers. There was no wallet or other form of identification on or near the body. There were no scars, tattoos, or other identifying marks present. Fingerprints were obtained, but no antemortem fingerprints were on record. During the initial clinical dental examination several composite restorations were noted. These restorations closely matched the shade of the surrounding tooth. A small UV LED light was then used, and several additional composite restorations became visible. The radiographic examination confirmed the presence of multiple composite restorations which were detected by the UV LED light.

The local police department was notified of a possible missing person. Good detective work allowed investigators to obtain the antemortem radiographs and treatment records of a possible missing person. The antemortem and postmortem radiographs and treatment records confirmed that this was a positive identification.

The use of UV LED lights is not meant to be a substitute for careful visual and radiographic examinations. However, with the increased use of composite dental materials these lights can be valuable in identifying the presence of composite resins that might be overlooked during the visual examination or difficult to detect with radiographs.

UV LED Lights, Composite Restorations, Forensic Odontology

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