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## G9 Methodology and Interests of 3D Modeling of Bitemarks

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After attending this presentation, attendees will understand the methodology used and the interests of the optical impression of the bitemarks on a victim's skin and on the dental arches of the suspects. This technology offers a color 3D view of injured tissue and teeth and allows the backup of all data later submitted for analysis.

This presentation will impact the forensic science community by explaining how this new protocol and advanced technology will make experts aware that the recording of the shapes of bitemarks and the development of their features can be achieved in good condition either at the crime scene before any manipulation of the body or at the forensic medical institute with no risk of image distortion (poor angle of the photographic view taken) or skin deformation by overload stemming from the application of a conventional impression material (alginate, silicone). This protocol, which was laboratory tested, can be used for expert bitemark analysis.

As long as the protocol of modeling of the dental arches in 3D exists, the use of optical imprint technology is enough to reproduce the real shape of bitten human skin.

**Material:** The material used for the modeling of the 3D dental arches and for the modeling of injured tissues is unique. A laptop is necessary and works well to gather real-time 3D image analysis, reconstruction, and data storage software programs. An optical camera linked to the laptop by a USB port provides for the taking of impressions.

**Method:** All the tests carried out check that the imprint of the bitemarks on the victim and the imprint of the dental arches of the suspects are automatically made in the same scale. Repetitive results are also verified, thus allowing the superimposition of teeth and bitemarks without any risk of unmanaged enlargement. Moreover, modeling and image processing must allow for the 3D superposition of bitemarks and of the dental arches. The color of the lesions are verified, as well as that the teeth are of optimal quality, and that the measurement tools available meet the specific needs and are reliable. This is the process for cuts made on teeth before being superimposed on bitemarks.

**Conclusion:** Dental computer-aided design/computer-aided manufacturing used in forensic dentistry provides reliability in the study of bitemarks. It avoids the errors related to the photographic shots at a bad angle and the consequent change of data. The 2D image replaced by a 3D image becomes a concrete support and the superposition of the teeth and bitemarks provides a more accurate analysis. The latter, presented to a magistrate, will facilitate the comprehension of the bite process.

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### Dental CFAO, Bitemarks, Postmortem