## F18 Postmortem Dental Examination: 3D Modeling of Dental Arches

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After attending this presentation, attendees will understand the interest in the postmortem dental examination carried out by optical impression, especially as it most often allows one to avoid the sampling of the mandible, since it presents a 3D color picture of the dental arches and backs up a large quantity of data.

This presentation will impact the forensic science community by making the experts aware of the fact that, thanks to this new protocol and the cutting edge technologies used, most postmortem (PM) dental examinations may be carried out in good conditions while complying with the forensics' ethics and the international directives. This new protocol tested in the Forensic Science Institute of the French Gendarmerie is currently used in some cases.

The objective of this study is to finalize an examination protocol in forensic odontology that corresponds with the needs and ethics of forensic odontologists while complying with the international and national directives and especially those of the International Criminal Police Organization (INTERPOL) concerning the sampling of mandibular and maxillary pieces. In the guide dealing with the identification of the victims of a disaster (INTERPOL 2009), the postmortem data collection describes in chapter 6 the characteristics of the PM dental examination. It determines the conditions of the removal of the maxilla and the mandibles. "The extraction of the jaw(s) should not be considered unless under exceptional circumstances. The odontologist must present the arguments justifying this procedure to the person in charge of the supervision of the dental examinations on the PM site beforehand…"

The virtual autopsy exists today in forensic pathology and the equipment compatible with this kind of examination starting to be used in autopsy rooms. The forensic odontology must follow this evolution and it is up to the forensic odontologists to propose the new protocols which will be approved in the next few years. They must also test the most reliable, most maneuverable, and easiest equipment to use. New technologies are there to help solve the problems of low-quality mandibular and maxillary samples during postmortem examination.

This research tested the optical impression's capacities to carry out PM examinations without resorting to dissection. A protocol was initiated in order to avoid sampling of anatomical pieces while providing as much information necessary for identification.

**Materials and Method:** The use of a laptop is necessary and sufficient to gather real time 3D image analysis, reconstruction and data storage software programs. An optical camera linked to this laptop by a USB port provides for the taking of impressions. The methodology of the study differentiates several programs. First, a round of tests of impressions on dry skulls has been performed by several forensic odontologists who had receivedonly a basic introduction to practice optical impression taking. A second program has allowed the same experts to carry out tests of impressions on living individuals lying on a fake autopsy table. These tests were intended to check the handling ability of the equipment, the accessibility to the oral cavity, and the ergonomics. Finally, a third program was initiated to validate the intervention on deceased bodies and determine the protocol.

**Conclusion:** The access to the dental CAD/CAM in forensic odontology gives another dimension to postmortem data collection.

The data can be exported with speed and facility both from an autopsy room to a laboratory nearby and to a processing center on the other side of the world.

If it seems possible to initially decrease by the number of samplings by 50%, the results should quickly reach a reduction of 80% in the years to come.

This work complies with forensics' ethics and the needs of experts as much as the virtual autopsy does, but it can only progress with the consent of the scientific community.

**Dental CAD/CAM, Postmortem Examination, Ethics**

 ** Presenting Author*