F24 Postmortem Assaults on a Variety of Denture Labelling Systems

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After attending this presentation attendees will appreciate the physical characteristics of a range of denture labeling systems and their resistance to extremes of temperature and pH.

This presentation will impact the forensic science community by highlighting the need for resilient, effective, and patient acceptable means of labeling dental prostheses.

The value of natural teeth (and associated oral tissues) to forensic dentistry is evidenced many times over in the dental literature. The edentulous patient on the other hand presents a more perplexing problem as far as determination of identity is concerned. Whilst 16 -18 matching elements are usually required for a positive identification by fingerprint analysis, an appropriate number of comparison features for dental identification has not yet been established, owing to the infinite number of possibilities. Hence, in the case of the edentulous individual, the marking of dental prostheses provides an opportunity to give the anonymous/stereotype denture the uniqueness inherent to the natural dentition.

Forensic organizations worldwide have recommended that dental prostheses be labeled with at least the patient's name and preferably with further unique identifiers such as social security number etc. The practice of denture marking has been conducted over many years and several denture marking systems have been reported in the dental literature. However, very little is known about the resilience of such systems to conditions experienced in the majority of post- and perimortem assaults.

The purpose of this investigation therefore, was to expose a selection of denture labels (made from either paper, plastic, or metal) to a series of hostile environments, simulating conditions in which bodies may be found. One label included in the study was an RFID system consisting of an electronic data carrier, generally known as a tag or transponder. The tag consists of a torpedo shaped microchip with a coiled antenna, measuring enclosed within an 8.5mm x 2.2mm glass capsule.

The specimens were mounted into a 10 x 10 x 0.5cm block manufactured from Poly methyl methacrylate acrylic (PMMA) pink/veined denture base resin. One example each of the denture identification labels were then placed into the block to a depth of 2mm before being covered by clear self cure PMMA.

Postmortem assault conditions included:

- Burial of up to six months in acid soils of various levels of pH,
- Emersion in sea water for periods of up to 6 months,
- Emersion in fresh water for periods of up to 6 months,
- Emersion of up to 6 months in concentrated Milton disinfectant,
- Freezing in temperatures of approximately -20^{0}C for up to six months.
- Emersion in concentrated sulphuric acid for a period of 24 hours.
- Emersion in concentrated sodium hydroxide Na OH for 24 hours.
- Emersion in liquid nitrogen for a period of 3 minutes.
- Exposure to a naked flame until the specimen block caught fire and was allowed to burn.

Results of the study indicate that the majority of the denture labeling systems appear capable of withstanding a range common, and not so common postmortem assaults. With regard to thermal insult however, most performed badly with the exception of a label constructed from stainless steel orthodontic band. However, the RFID-tag performed above expectations in the majority of experiments. Furthermore, its cosmetic appearance has proven most popular with many patients.

Human Identification, Postmortem Assaults, Dentures

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