F6 Bite Marks: Physical Properties of Ring Adhesion to Skin

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After attending this presentation, attendees will acquire a better understanding of the factors influencing ring adhesion to skin.

This presentation will impact the forensic community by providing scientific evidence and evaluation of different methods for ring adhesion in addition to potentially affecting the ABFO bite mark guidelines.

A recent article[1] suggests that 87.5% of Diplomates of the American Board of Forensic Odontology excise the bite site on cadavers. It is also well documented that unsupported excised tissue may shrink by as much as 50% or more.[2] In 1981, a method was developed for ring fixation prior to tissue excision.[3] Several other methods have since been proposed to minimise tissue distortion. The scientific literature, however, reveals little supporting evidence for the preferential use of one adhesive/suturing technique over another in bite mark excision.

In August of 2007, a one week hands-on training course on bite marks was held at the "*Laboratoire de sciences judiciaires et de médecine légale"* in Montreal. This yearly session is part of an online forensic dentistry course which incorporates theory and practice leading to a certificate in forensic Odontology from the Faculty of Dentistry at Mc Gill University since 2004. During this module, the "Dorion type 5 technique" was used for pig skin excision. It incorporates TakÒ hydroplastic, mosquito fiberglass netting (screen), and cyanoacrylate gel. A new method was adopted in preparing the pig skin which involved the use of VeetÒ, a commonly used chemical depilatory. The results were disastrous; almost all of the rings separated from the skin during excision and the idea of experimenting on the physical properties of ring adhesion to skin was born.

Ring detachment can be attributed to many factors including temperature variations, ventilation, atmospheric humidity, body wetness, and temperature as well as the cyanoacrylate's physical properties not to mention other chemicals. However, little research has been accomplished to scientifically demonstrate these hypotheses as clinical experience prevailed.

The present task undertook the challenge of comparing methodologies using specific instrumentation and software used in the forensic area of ballistics with TriggerScanTM version 2.0.

The purpose of the first phase of this multi-level research is to study the measurements obtained of the tensile stress needed to rupture the bond between TAKÒ hydroplastic, the cyanoacrylate, and the pig skin. The pig skin conditions varied from untreated and hairy to shaved with and without different materials including soap, shaving cream; to treated with ethanol, VeetÒ, etc. at room temperature, with humidity/condensation/wetness removed, and with "fresh" cyanoacrylate glue versus gel. The results give a clearer scientific exposé of the physical properties of the various materials utilized and their interaction.

In conclusion, by compiling and analyzing the precise measurements, risks of tissue distortion during bite mark excision could be significantly reduced by utilizing recommended techniques and materials which could ultimately facilitate perpetrator identity.

References:

1, 2 Tissue Specimens: Invasive Analysis; Bite mark Evidence, Dorion RBJ, ed., Marcel Dekker (CRC Press), New York, NY, 2005; 228-29.

3 Dorion, RBJ, Preliminary research on the preservation of traumatic injury patterns. Canadian Society of Forensic Science. Hamilton, ON., Aug. 1981; and Dorion RBJ, Preliminary research on the preservation of traumatic injury patterns. American Academy of Forensic Sciences. Orlando, FL., Feb. 1982.

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