F27 Bite Marks: Physical Properties of Ring Adhesion to Skin - Phase Two

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After attending this presentation, attendees will acquire new information regarding factors influencing ring adhesion to skin.

This presentation will impact the forensic science community by providing scientific evidence for the different methods for ring adhesion in addition to potentially affecting the American Board of Forensic Odontologists (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; but little research has been accomplished to scientifically demonstrate these hypotheses as clinical experience prevailed.

The present task is a continuation of Phase 1 presented at last year's AAFS meeting in Denver. It compares ring adhesion methodologies using instrumentation and software from another forensic arena, ballistics, the TriggerScan™ version 2.0.

In addition, Phase 2 deals with: 1. studying the amount of the tensile stress needed to rupture the bond between TAKÒ hydroplastic, the Loctite Supergel and the pig skin that was previously shaved and cleaned with dishwashing detergent and ethanol, with special consideration to temperature factor; 2. Comparing histologically the differences in pig skin when untreated/treated, cleaned with various agents including Veet; 3.Comparing the solubility of different cyanoacrylate glues in formalin 10%, and 4.Testing the Dorion Type 5 technique and its modifications on the TriggerScan with different cyanoacrylate glues. 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 and loss of adhesion 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.

Bite Marks, Ring Adhesion to Skin, Trigger Scan

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