G68 Pseudo Searing of the Skin Around Contact Gunshot Wounds

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The goals of this presentation are to challenge the assumption that blackened skin around contact gunshot wounds is due to heat and to offer an alternative explanation for the cause of the skin color change.

This presentation will impact the forensic science community by presenting new data to challenge the longstanding belief that the black area of skin around a contact gunshot wound is due to soot forced into the skin rather than burning of the skin (or searing) from heat.

Searing of the skin by hot gases from contact gunshot wounds has been long documented in the forensic pathology literature; however, it has not been reliably shown that hair on and around the skin of the wound is burned by the hot gases of combustion. If the heat of the combustion is high enough to burn the skin, then it should affect the hair in and around the skin as well. Burning requires enough heat energy be transferred to the tissue to cause injury. The muzzle flash and the hot gases expelled from the end of the barrel are very brief in duration, even though the temperature has been measured at 1700K to 2000K (1400°C to 1700°C). The effect on the hair is minimal as the heat energy is small. The hypothesis is that hair burns much more easily than skin. Simple flame tests were performed on hair-bearing skin and the effect of the heat and flame documented. The hair burned and was consumed without evidence of any visible damage to the underlying skin.

A retrospective review of color photographs of 270 cases of contact gunshot wounds to the head and chest that occurred from January 2010 to July 2012 was conducted to assess the condition of the hair around the wound. The finding of unaffected hair around the wounds suggests that the black area of skin around a contact gunshot wound is not due to heat applied to the skin by gases. The review cases showed a wide variety of calibers and power variation. The microscopic features described in the literature can potentially also be explained by the soot being pushed at high pressure into the tissues around the wound that have already been abraded by the passing of the projectile. The features are therefore a kinetic energy effect rather than a heat or burn effect. The disrupted appearance of the cells with soot ingrained into the area gives the appearance of searing. Microscopic sections of tests fired through donated cadaver scalp at different ranges from contact to distant using 9×19mm Parabellum ammunition will be presented showing the features of each range.

In 127 cases, the photographs reveal that the hair was not burned. The remaining cases did not have adequate photographs to assess the status of the hair, or the wound was in an area of the body with no surrounding hair.

The longstanding belief that skin is burned or seared during a contact gunshot holds no merit. The photographs from 127 cases reveal that the hair in and around the wound remains intact and, since hair is more susceptible to heat damage than skin, allows the previously documented theory of searing to be reasonably challenged.

Contact Gunshot, Searing, Hair

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