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## Iron Staining of the Hands in Suicides with Firearms

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In death resulting from gunshot wounds it is the routine policy of the Southwestern Institute of Forensic Sciences to examine the hands for evidence of powder and primer residues. In the past three months while performing such examinations the authors encountered three cases in which there was an orange-brown discoloration of the skin of the palm of one hand. Several months ago, one of the authors (V. J. M. D.) had been contacted by another medical examiner<sup>2</sup> who had noticed this phenomenon and did not know its cause. He indicated that his cases were suicides and that the weapon had been a long arm. The authors at that time had no explanation.

In an attempt to determine what caused this discoloration in their cases the authors reviewed scene photographs and investigative reports of the three deaths and submitted tissue from the palms for both microscopic and analytical analysis.

### **Case Reports**

#### *Case 1*

A 67-year-old white male was found dead at his residence, sitting on a dining room chair and clutching a .308 Winchester rifle with his left hand. The hand was approximately halfway up the barrel. The deceased had been depressed for the preceding three months and had talked of suicide on many occasions. Postmortem examination revealed a contact gunshot wound under the chin and an orange-brown stain arranged in a linear pattern on the palm of the left hand; the stain could not be removed even with vigorous scrubbing (Fig. 1). The deceased had been dead less than 12 h.

#### *Case 2*

A 25-year-old black male was found in his bedroom, lying faceup on the floor. The barrel of the suicide weapon, a .303 Enfield rifle, was still clutched in his left hand. The victim had a long history of mental illness. Postmortem examination revealed a contact gunshot wound to the roof of the mouth and an orange-brown stain on the palm of the left hand. The deceased had been dead less than 4 h.

#### *Case 3*

A 39-year-old white male was found dead in the cab of his pickup truck. The barrel of his .22 caliber rifle was still resting in his hand. There was a history of mental illness.

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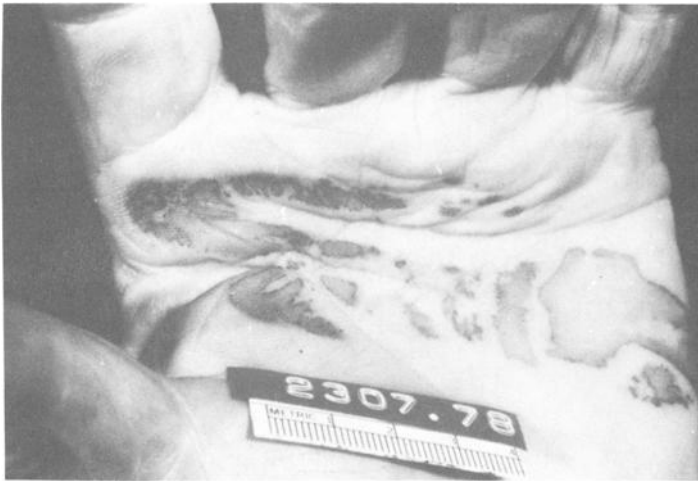


FIG. 1—Linear discoloration on the left palm, Case 1.

Postmortem examination revealed a contact gunshot wound to the right temple and an orange-brown discoloration on the left palm. The victim had been dead approximately 24 h.

### Discussion

All three cases were suicides who used rifles, and the rifle barrel remained clutched in the victim's hand after death. The authors hypothesized that iron from the barrel aided by the salt and water in perspiration created simple rust stains. Microscopic examination of skin from the palm showing the orange-brown discoloration as well as skin from the opposite palm for control was performed. Special stains for iron were positive on the left palm only. Energy dispersive X-ray analysis was done on the tissues. The skin with the orange-brown discoloration showed high levels of iron as compared to the control.

### Conclusion

Orange-brown discolorations of the palm can be expected in those suicides by gunfire where the barrel of the weapon remains in the victim's hand after death. These have been shown to be simple rust stains. This finding could be extrapolated so that one might expect the same type of discoloration on any sweaty part of the body if it lies for a period of time after death against an object containing iron.

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