

CASE REPORT

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Recapturing a Five-Month-Old Bite Mark by Means of Reflective Ultraviolet Photography

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ABSTRACT: After a brutal rape, which the victim survived, a bite mark was photographed and other evidence was collected. It was not until several months later when the bite mark became a critical piece of evidence, that the problem with its collection became apparent to the prosecutor. The photograph of the bite mark taken by law-enforcement officials at the time of the crime did not include a reference scale. Therefore the bite mark was of little evidentiary value. The authors subsequently examined the victim (five months later) and "recaptured" the bite mark pattern with a proper reference scale by means of reflective ultraviolet photography.

KEYWORDS: odontology, bite mark, reflective ultraviolet photography, ultraviolet light, reference scale, evidentiary purposes

On December 16, 1990 a 55-year-old, white female was attacked in her home and terrorized for seven hours by a white, male intruder. During the course of this attack, the victim was subjected to rape, assault, threats, and deviate sexual acts. At some point during this seven hour ordeal, the victim was also bitten on the back of the left shoulder. This bite mark was photographed by law-enforcement officials (Fig. 1). However, none of the photographs included a reference scale (Fig. 2). The victim was able to identify a suspect, despite not having seen his face, because he spoke with a lisp and was known to her. The crime scene was processed and although a great deal of forensic evidence was collected, comparison of crime-scene evidence with blood and hair samples from the suspect proved inconclusive.

Subsequently, all evidence in the file was reviewed by the prosecutor. Dr. Sobel was then contacted and asked to examine the bite mark photograph obtained by the police (Fig. 1). The prosecutor was informed that the photograph depicted a human bite mark, but because there was no reference scale, comparison with a potential suspect was not possible.

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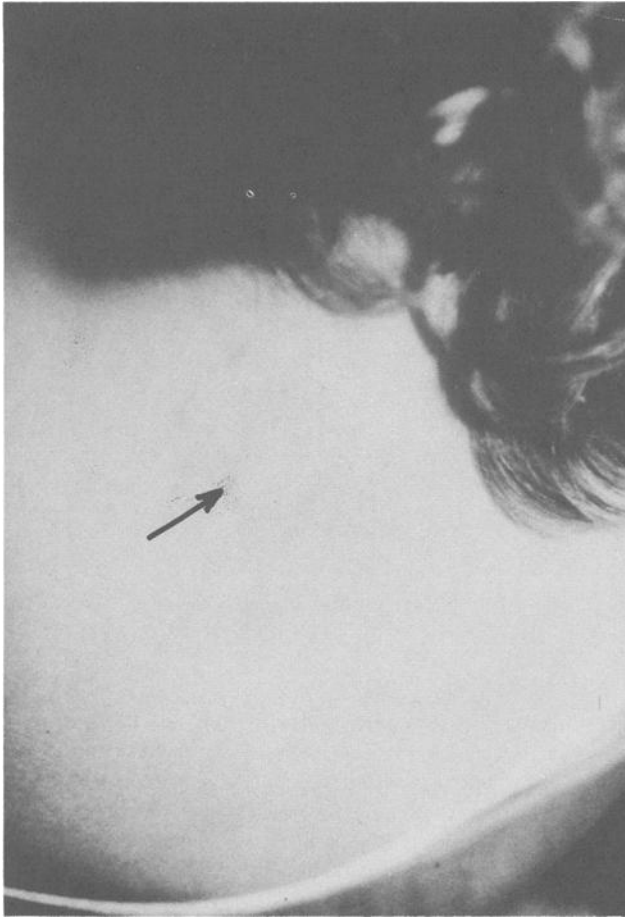


FIG. 1—*Police bite mark photo—December 1990.*

Since the other forensic evidence gathered was inconclusive, the bite mark now became crucial to the case. The prosecutor inquired as to what could be done to properly document the bite mark. The authors related that a case involving similar circumstances had been presented at a scientific meeting [1]. Based on this information, the prosecutor authorized an examination of the victim with ultraviolet light in an attempt to “retrieve” and properly document the bite mark in question, which was already 3 to 4 months old.

The examination took place on May 19, 1991 and the technique used followed the recommendations developed by other odontologists [2,3]. The technique included the use of a “black light” as an ultraviolet light source for scanning the victim. The photography included the use of a tripod, 35 mm camera with glass macro lens, conventional flash, and OX1 ultraviolet filter over the lens. The appearance of the back of the left shoulder was documented with a black and white photograph prior to ultraviolet light examination (Fig. 3). Subsequent examination of the victim with long wave ultraviolet light revealed an area containing a significant injury pattern that was outlined with a marker and the location documented with a black and white photograph (Fig. 4). The area in question was then photographed using the reflective ultraviolet photographic techniques as mentioned. A number of bracketed exposures were obtained using a variety of f-stops and shutter speeds.

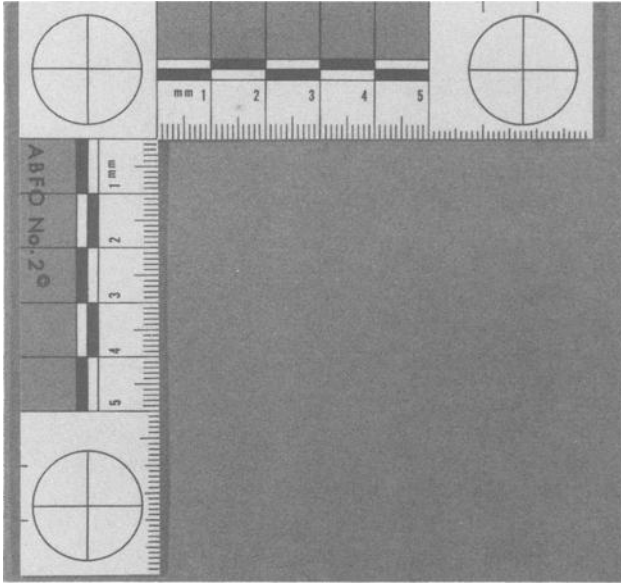


FIG. 2—ABFO #2 scale.

The exposures that yielded the best detail of the injury pattern in question were those that followed the recommendations made previously by Dr. David (f-8, $\frac{1}{8}$ sec.) [4]. The best of these exposures was selected for evidentiary use in court (Fig. 5). Both authors were in agreement that the injury pattern depicted in Fig. 5 was a human bite mark and could be compared with models of the suspect's teeth previously obtained by Dr. Sobel.

The model of the suspect's maxillary teeth revealed several individual characteristics (Figs. 6 and 7). These characteristics included: 1) a missing right lateral incisor (#7), 2) a wear pattern on the incisal edge of the right central incisor (#8), 3) prominence of the left central incisor (#9) as compared with its counterpart (#8), 4) a "peg" left lateral incisor (#10), 5) space closure between teeth numbers 6 and 8, and 6) teeth numbers 8 and 10 out of the plane of occlusion as compared with teeth numbers 6, 9, and 11. All of these characteristics were apparent in Fig. 5. The model of the suspect's mandibular teeth also showed a number of individual characteristics (Figs. 8 and 9). These characteristics included: 1) a missing left lateral incisor (#23), 2) a missing left central incisor (#24), 3) a missing right central incisor (#25), and 4) partial closure of the space between teeth numbers 22 and 26 so that the existing space could accommodate only two teeth. These individual characteristics were also demonstrated in Fig. 5. Both authors were in agreement that the suspect's teeth compared favorably with the bite mark in question to a reasonable degree of dental certainty.

This evidence was presented to the jury at trial, and after two hours of deliberation, the jury returned a guilty verdict on all counts of a multiple indictment. After the trial, Fig. 5 was computer enhanced by another odontologist [5]. This computer enhancement (Fig. 10) yielded even more detail of the bite pattern contained in Fig. 5.

Conclusions

The use of ultraviolet light examination and reflective ultraviolet photography successfully "recaptured" a five month-old bite mark on a surviving rape victim. This documentation was essential to establishing an evidentiary link between the victim and the suspect. Without

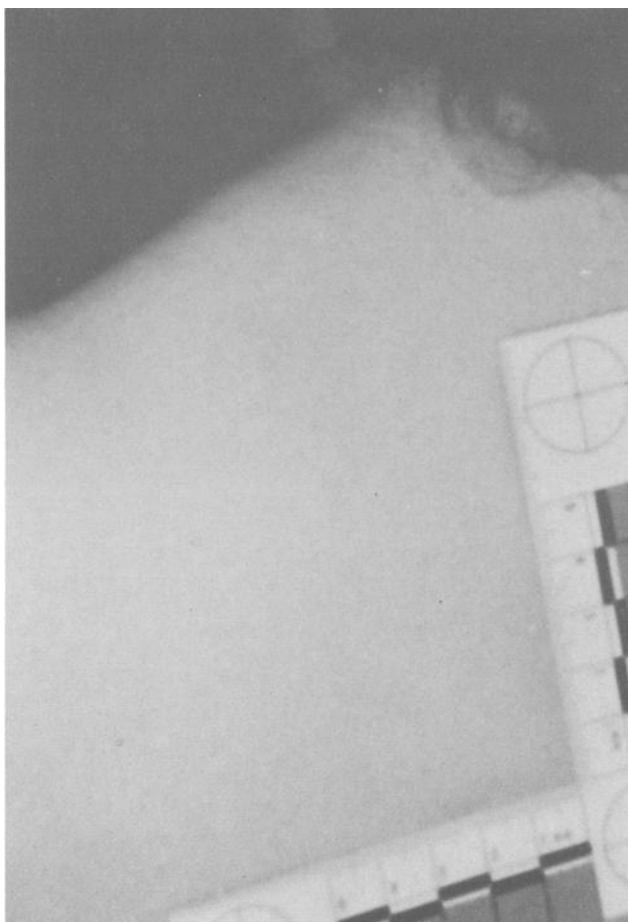


FIG. 3—*Black and white photo of victim—May 1991.*

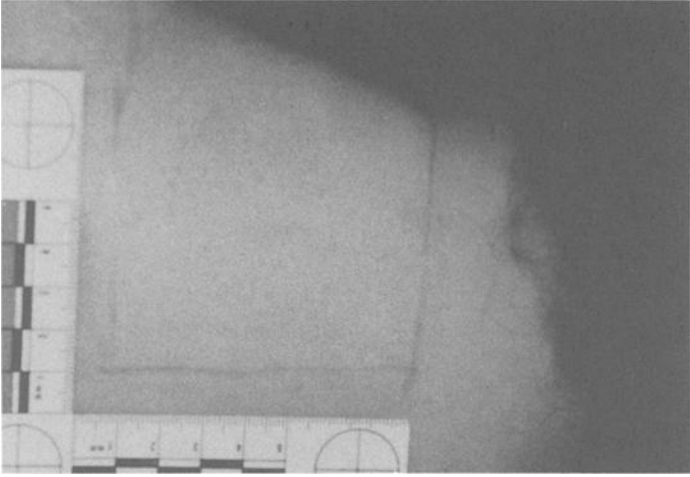


FIG. 4—Black and white photo of victim—May 1991.

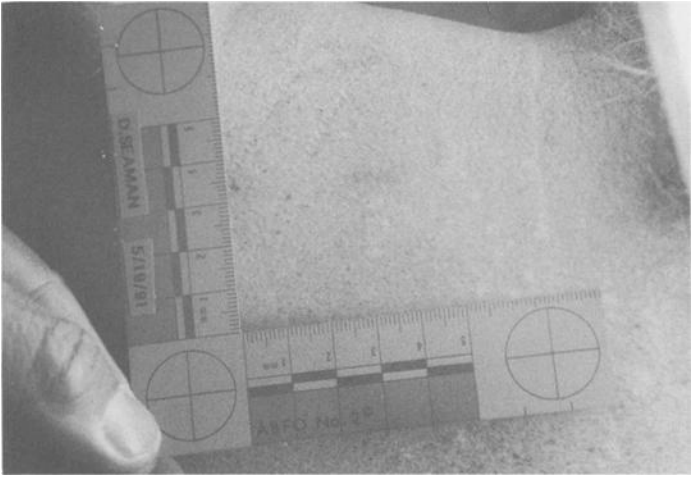


FIG. 5—Reflective UV photo of victim—May 1991.



FIG. 6—*Suspect's upper model—facial view.*



FIG. 7—*Suspect's upper model—occlusal view.*

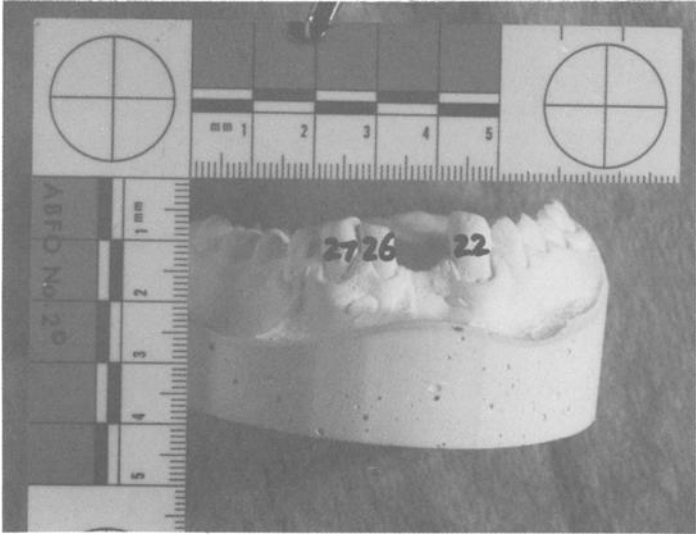


FIG. 8—Suspect's lower model—facial view.



FIG. 9—Suspect's lower model—occlusal view.

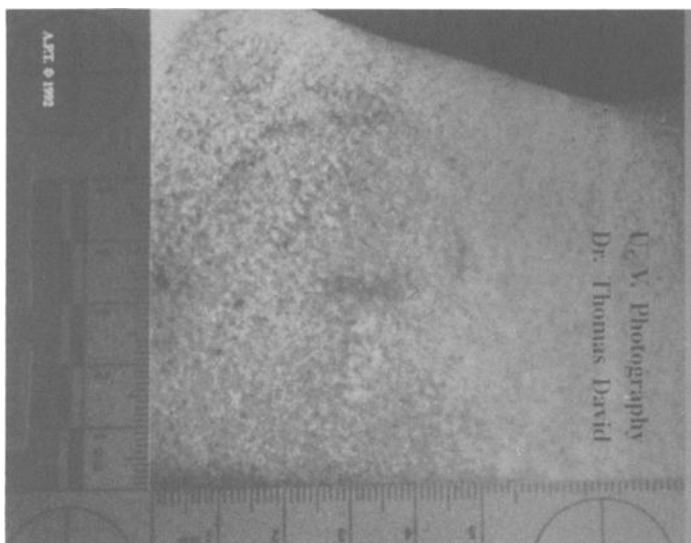


FIG. 10—Computer enhancement of Fig. 5.

this critical piece of evidence, it is unlikely that there would have been sufficient evidence to support a conviction for this vicious crime.

References

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