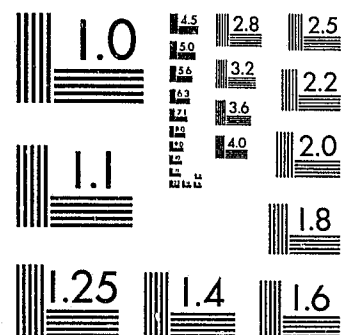


National Criminal Justice Reference Service



This microfiche was produced from documents received for inclusion in the NCJRS data base. Since NCJRS cannot exercise control over the physical condition of the documents submitted, the individual frame quality will vary. The resolution chart on this frame may be used to evaluate the document quality.



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Microfilming procedures used to create this fiche comply with the standards set forth in 41CFR 101-11.504.

Points of view or opinions stated in this document are those of the author(s) and do not represent the official position or policies of the U. S. Department of Justice.

National Institute of Justice
United States Department of Justice
Washington, D. C. 20531

9/29/83

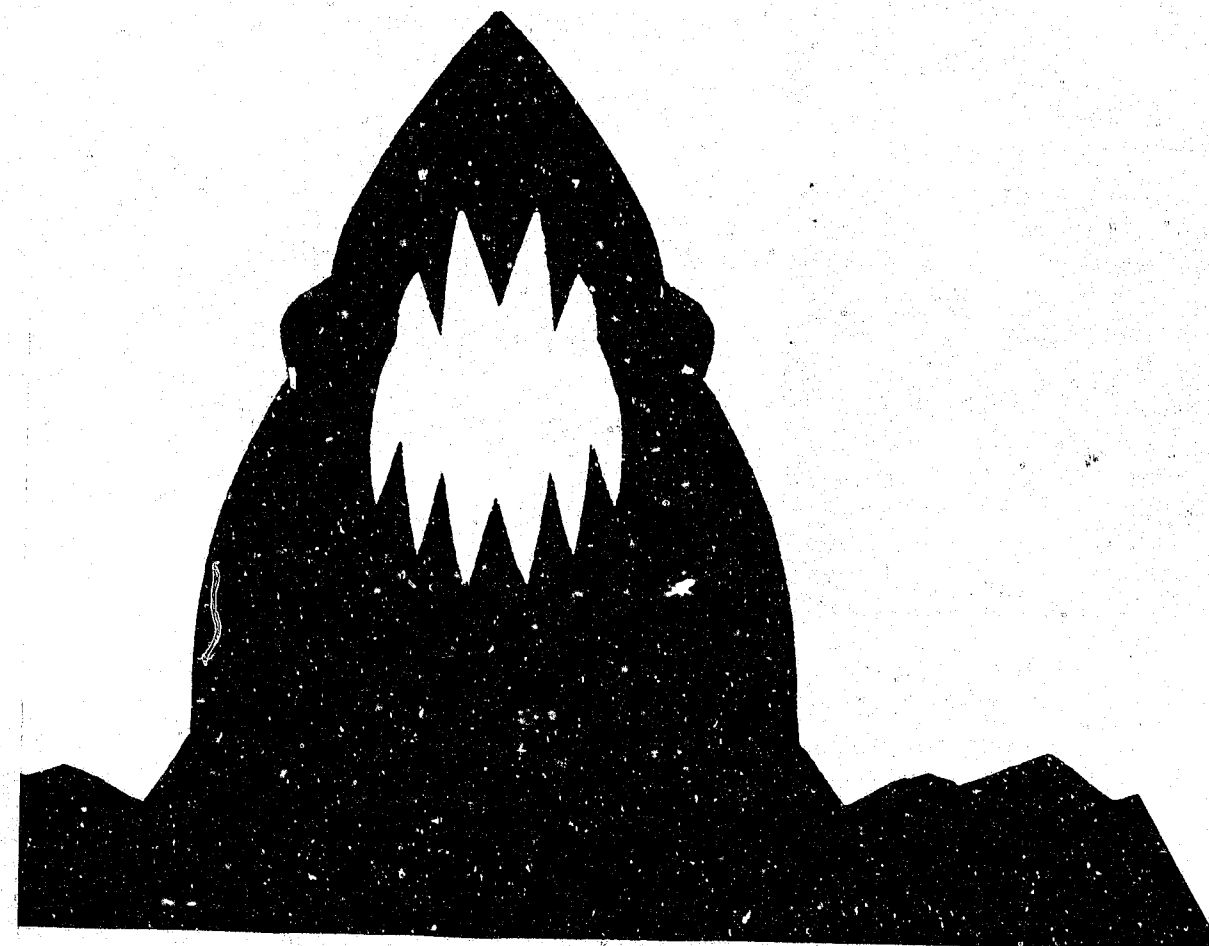
The Detective

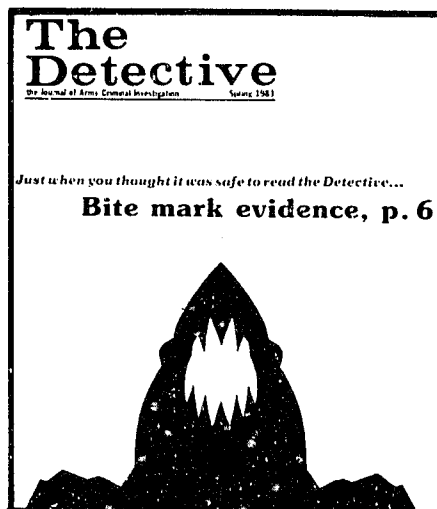
the Journal of Army Criminal Investigation Spring 1983

Just when you thought it was safe to read the Detective...

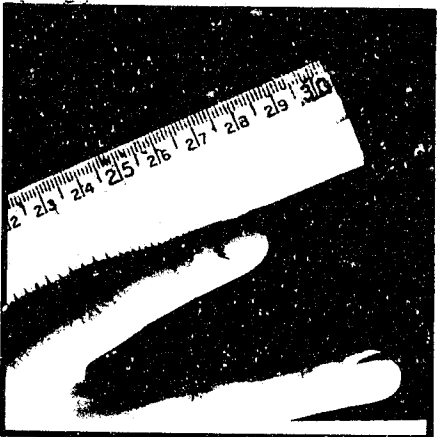
Bite mark evidence, p. 6

89510

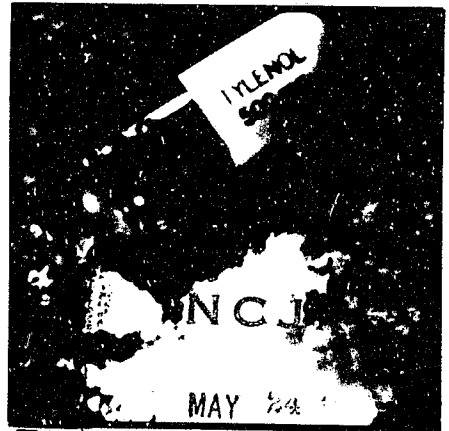




Cover



Page 9



Page 21

ACQUISITIONS

Commander: Maj. Gen. Paul M. Timmerberg
Chief of Public Affairs:
Lt. Col. Samuel D. McKinney
Editor: Alice Russell
Associate Editor: Grace Jones
Production:
SSgt. Lewis D. Knight
Sp5 Arthurlyn S. Mitcham
Composer: Theresa Hilton
Cover Design: Grace Jones

Vol. 10, No. 1

The Detective

the Journal of Army Investigation Spring 1983

Features

- The use of bite mark evidence** ⁸⁹⁵¹⁰ **6**
- Investigative leads from checks** **23**
- Depicting evidence in crime scene photographs** **28**
- Investigatives techniques** **33**

Departments

- Facts and views** **3**
- Case notes** **14**
- Eye openers** **21**
- Line items** **26**

The Detective (ISSN 0744-2955) is published quarterly by the U.S. Army Criminal Investigation Command (USACIDC), at 5611 Columbia Pike, Falls Church, VA 22041. Application to mail at second-class postage rates is pending at Falls Church, VA. POSTMASTER: Send address changes to the Detective, USACIDC, 5611 Columbia Pike, Falls Church, VA 22041.

The Detective is a major Army command official publication, authorized by Army Regulation 310-1 and 310-2. As stated in Army Regulation 310-1, "The fact that such publications are considered 'official' does not imply that they contain approved Department of the Army doctrine."

The Detective publishes articles providing information to USACIDC special agents and staff members, as well as to other members of the military and civilian law enforcement community on criminal investigative techniques from its readers, which may be sent directly to the editor.

Unless otherwise noted, material in the Detective is not copyrighted and may be reproduced without prior approval, provided a credit line is given to the "The Detective, a publication of the U.S. Army Criminal Investigation Command."

This document has been reproduced exactly as received from the person or organization originating it. Points of view or opinions stated in this document are those of the authors and do not necessarily represent the official position or policies of the National Institute of Justice.

Permission to reproduce this copyrighted material has been granted by
The Detective

to the National Criminal Justice Reference Service (NCJRS).

Further reproduction outside of the NCJRS system requires permission of the copyright owner.

Use of Bite mark Evidence

by Special Agent James M. Adcock, USAMPS

For years, bite mark evidence has been an invaluable investigative tool. Until the late 1970s, the United States was somewhat behind our European counterparts. In fact, according to an article, "Obtaining Bite Mark Impression from Skin," FBI Law Enforcement Bulletin, January 1982, in 1979 more cases of bite marks were analyzed than in all of the preceding 10 years.

This article is to familiarize criminal investigators with bite marks so that this type of evidence is not overlooked and to provide some guidelines on how bite mark evidence should be processed.

In the military, there have reportedly been many cases involving bite mark evidence. However, the author only has knowledge of two actually being presented in a military court of law: case one, described later, and a case, *U.S. v. 13 M.J. 66, (CMA 1982)* from the U.S. Marines.

At the end, a discussion of the two cases will be presented, illustrating different approaches to analyzing this type of evidence and the fact that bite marks can be of value to an investigation with either dead or live victims. It should be noted that the guidelines and procedures presented by the experts in this article are not hard and fast rules that have to be followed by all.

There are different opinions as to the method to use to make the comparisons. As a result, procedures may vary from one dentist to another. The guidelines are just that — a guide for the investigator to follow. The reader should be fully aware that each case is different and may require deviation from the guidelines.

The human adult dentition normally consists of 32 teeth, each having its own characteristics. The size and shape will leave a pattern unique to that set of teeth.

Normally, the dentist will make a comparison of the bite mark pattern with the dental alignment and characteristics of the dentition of a suspect. E. H. Dinkel, in "The Use of Bite Mark Evidence as an Investigative Aid," which appeared in the *Journal of Forensic Science*, said that, depending upon circumstances, bite mark patterns may be found on food stuffs and other objects or on a person. Bite marks inflicted by a victim upon the assailant may also be seen.

Characteristically, human bite marks are found in sex-related incidents, both heterosexual and homosexual, and on victims of child abuse. In dealing with a child abuse case, caution should be taken, as the mark could have been inflicted by a sibling versus the child abuser.

Some bite mark analysis consists of comparing a life-size photographic/reproduction of the bitten area with the dental molds of a suspect. Irvin M. Sopher, in the book *Forensic Dentistry*, shows that dental molds are impressions of the suspect's mouth and are, therefore, identical to the dentition and are life size.

Ideally speaking, a forensic odontologist should be consulted to do the comparisons; however, the immediate availability of such a dentist with bite mark expertise is a rarity. Any dentist possesses the knowledge to perform such an analysis and has in his office all the necessary equipment and materials to obtain the appropriate evidence.

In the event a bite mark is found during an investigation, one of the following should be contacted to obtain the best available person to make the comparisons. Some may be forensically oriented and have bite mark expertise, but for the most part, in the military, they will not.

Conus

- Department of Forensic Sciences and Armed Forces Institute of Pathology
- Local medical examiner's or coroner's office
- Civilian universities with a dental school

Overseas

- Local dental facility
- Local pathologist
- Medical laboratory that supports the hospital *

*The medical laboratory is usually located regionally and not in the hospital it supports. For example, in Europe, the 10th Medical Laboratory located at Landstuhl, Germany, is one which provides support to all the European Medical Department Activities.

Remember that if a nonmilitary dentist is used, a fee will probably be charged. The payment of such fees will have to be cleared through channels. Prepare yourself before that case comes in by coordinating with the local dental facility to see what is available. If someone with the expertise to do the comparisons is not available, identify a dentist to assist and obtain the appropriate evidence to be compared or analyzed by an expert.

Bite mark processed

Due to changes that rapidly occur in the appearance of a bite mark, the investigator should take immediate action. In dealing with dead tissue, decomposition will obscure the mark. Refrigeration should slow down this process. The evaluation of marks in live tissue also presents a problem in that their appearance will change due to possible infection, swelling, and discoloration from bruising of the underlying tissue.

According to Dinkel, again, the bite mark should be processed as soon as possible.

Victim saliva

When a bite mark is created, it is always accompanied by saliva from the perpetrator. This saliva sample, when examined by a serologist, may reveal the secretor status (for approximately 80 to 85 percent of the population) and the major blood group.

The sample should be taken with a sterile swab that has been dipped in either distilled water or a saline solution. Do not touch the cotton end of the swab because you could contaminate it with sweat or skin secretion.

To obtain this saliva sampling, conduct a circular swabbing of the bite mark from the outer edges to the center of the mark. Always obtain standards consisting of:

- a swab dipped in the solution but which does not come in contact with anything, and
- a swabbing from an unbitten skin surface.

To assist the serologist in the examination of these swabbings, obtain a saliva sample from the mouth of the victim.

If the victim is dead, obtain a swabbing with a cotton swab as described above. If the victim is alive, have that person chew on a piece of 2 by 2-inch sterile gauze until it is saturated (don't forget to submit an untouched piece of gauze to serve as a standard). Also obtain a blood sample (approximately 5cc) from the victim. Allow all these saliva samples to air dry before packaging, mark them accordingly, and, if possible, do not package in plastic or glass.

If all these samples are collected, the job of the serologist is made easier, and that could make the dif-

ference in the conclusion reached from the laboratory report.

Photography

Although it is recommended that the entire process be photographed, this is not always feasible. At the very minimum, the investigator should take the photographs in black and white, as well as in color. The photographer should use a measuring device, and for every photograph showing a scale obtain one without, and have at least one photograph that reflects the anatomic site of the bite mark.

In the book, *Dental Evidence*, I. A. Gladfelter explains that photographs should be taken from every conceivable angle using techniques of lighting and shading to emphasize details of the bite mark.

The measuring device is necessary so that a life size enlargement duplication of the bite mark can be made. According to Sopher, this will enable the dentist to make direct comparisons of measurements from the photograph with the life size models of the suspect and with dental wax bites derived from the models or the suspect.

Sopher shows that if the bite mark has been inflicted upon a convex surface such as the dome of the breast, the nose, or the convexity of the arm, it may be helpful to take separate photographs of each arch pattern since a single overhead photograph may distort the more distant rims of the arch.

An article in the July 1981 FBI Law Enforcement Bulletin, "Bite Mark Evidence in Crimes Against Persons," recommends that photographs of the mark be obtained at 24 hour intervals for approximately 3 to 5 days because changes

are inevitable and the mark could be more pronounced as time passes by.

Impression of Bite

All photograph work described above should be completed before any impression-making materials are applied to the skin's surface. The saliva sampling and photographs can be successfully accomplished by the investigator. After that, a licensed dentist should be the one to obtain impressions of the bite mark since a problem could arise if an expert does not perform this task.

Many bite marks are not sufficiently pronounced to warrant taking impressions, but by observing and photographing at 24 hour intervals, one will be able to tell if there is any depth in the marks.

Every dental facility stocks the appropriate materials to perform this process. According to Gladfelter, normally a rubber base or silicone material is used. From this impression, a cast is sometimes made.

Tissue Preservation

In dealing with dead victims, it may be necessary to remove the bitten tissue from the anatomic area for preservation as evidence and for further examination, if necessary. Be sure to clear this type of action through the supporting legal office and have a pathologist excise this bite mark. It should be stored in a 10 percent formalin solution. Expect 10 to 20 percent shrinkage.

After preservation and fixation of the bite mark, a histologic section of a contused segment should be examined microscopically. Although not that reliable, this may determine the time of the injury relative to the time of death.

Suspect

A dentist is the only person who should collect dental evidence from a suspect. Processing evidence taken from a suspect requires certain steps similar to those used in processing evidence taken from a victim.

Saliva sampling

Have the suspect chew a piece of 2 by 2-inch sterile gauze until it is saturated. Allow it to air dry before packaging and be sure the suspect is the only person who touched that piece of gauze. In support of this, obtain a blood sample.

Photography

The following photographs should be obtained:

- front — open and closed mouth
- profile — both right and left sides (have the suspect curl his lips so that his teeth are visible).

Charting teeth

The dentist should completely and thoroughly chart the suspect's teeth. If this process is done soon after the incident, the dentist should be alert for tissue between the teeth that may be from the victim, according to Dinkel.

Bite registration

Bite registration wax or dental wax is softened and inserted into the mouth of the person who should bite down on the wax. This biting leaves an impression of that individual's bite pattern. This process should be performed several times, having the

suspect bite with varying degrees of pressure (see fig. 1). Some forensic odontologists rely heavily on these registrations for measurements and comparisons.

Dental molds

The dentist should then obtain molds of both the upper and lower jaws of the suspect's mouth. These molds will represent a life size example of the suspect's dentition, which are necessary for making the comparison with the bite mark (see figs. 2 and 3). Again, measurements are taken and sometimes the molds are used to duplicate the pattern of the questioned mark.

Case No. 1

In December 1971, at Fort Meade, Md., a young woman was found murdered. She had been stabbed 23 times. At the autopsy, an alert CID special agent observed a bruise on the victim's arm that appeared to be a bite mark.

Subsequently examination of this bite mark and comparisons made

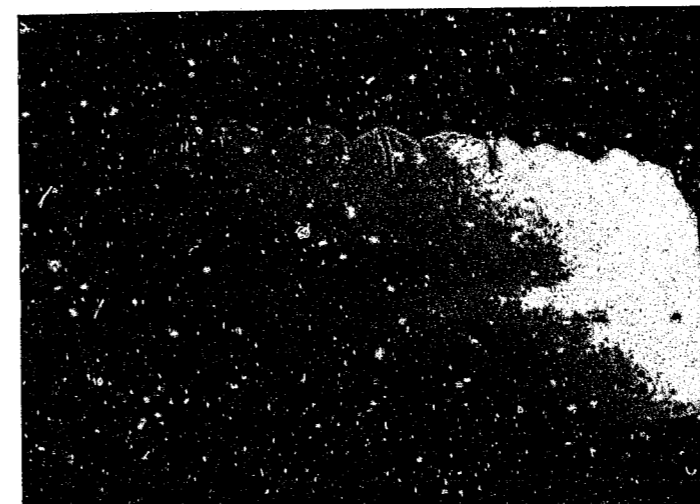


Figure 2. Dental mold of upper teeth.

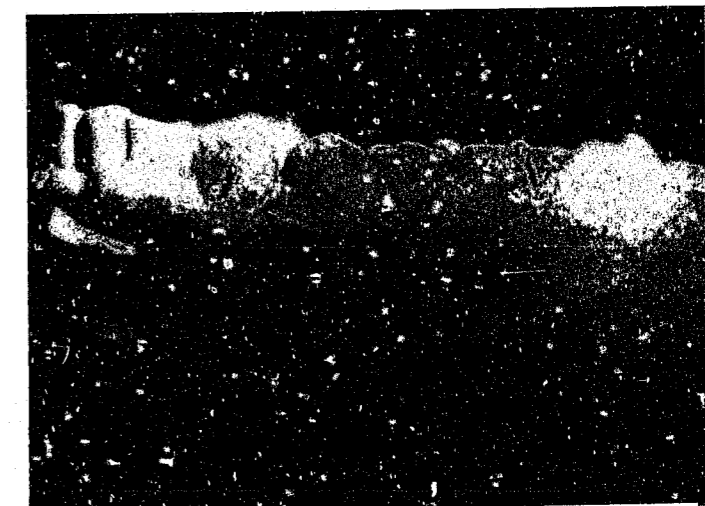


Figure 3. Dental mold of lower teeth.

with impressions of the suspect's teeth resulted in a positive identification and contributed to a general court-martial conviction (see fig. 4).

Case No. 2

In 1978, in the Federal Republic of Germany, a servicemember forcibly entered the apartment of a local national and sexually assaulted her. During the assault, while she was trying to ward him off, he bit her on the finger. During the interview of the victim, an alert CID special agent recognized the injury as that of a bite mark. It, too, was identified as coming from a particular person — the suspect. However, the suspect made a guilty plea, which precluded the necessity of using the bite mark evidence in a military court (see fig. 5).

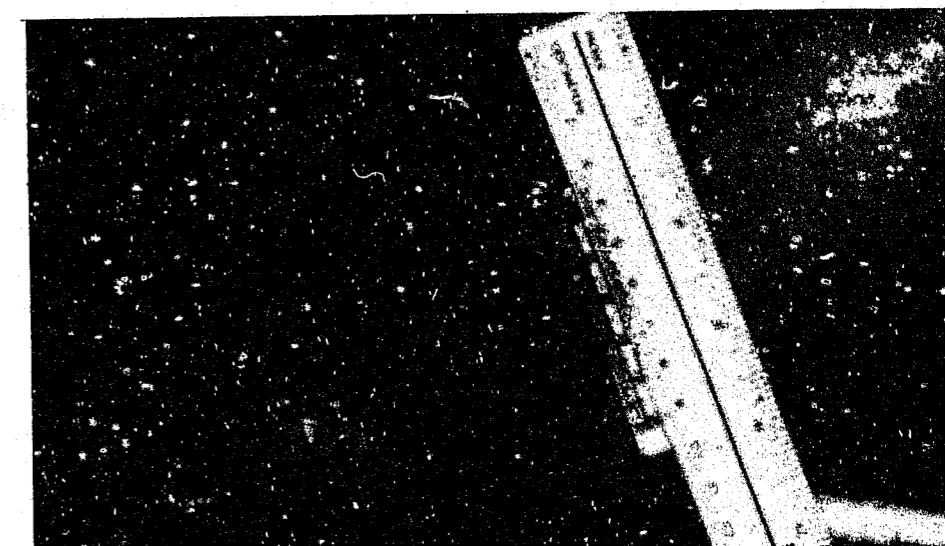


Figure 4. Case No. 1, bite mark surrounding a stab wound on a dead victim.



Figure 5. Case No. 2, bite mark on the little finger of a live victim.

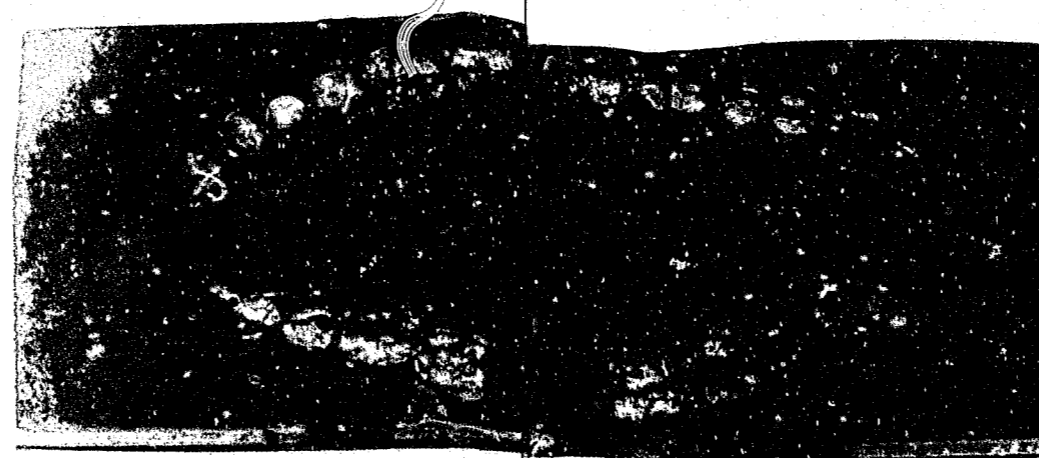


Figure 1. Bite registration (pattern).

Legal Considerations

U.S. v. Martin, 13 M.J. (CMA 1982). "Trial court did not err in admitting testimony regarding the identification of the bite mark found on the decedent's check, after the reliability of the science of bite mark identification was established."

Only two cases have been tried in the military court system. The treatment and admissibility of bite mark evidence is generally accepted, however, if it meets scientific standards.

In obtaining the appropriate evidence from a suspect, the investigator should consider this to be an "intrusion." He or she should, therefore, obtain consent or a search authorization. Exigent circumstances would only exist with the saliva sample in a case where a victim of an assault bit the assailant. It would then be necessary to obtain the sample from the bite mark immediately to preclude the saliva from being rubbed or washed away by the suspect. Beyond this, consent or a search warrant is required.

Precautions

The first precaution has already been mentioned — in child abuse cases, bite marks may have been inflicted by siblings, rather than an abuser. Be sure the bite marks were not made by a sibling. The second precaution is to be sure the bite mark was not self-inflicted. In a situation when the bite mark could have been self-inflicted, a bite registration and molds of the person should also be

obtained. This will dismiss the possibility that the bite mark was self-inflicted.

Case No. 1

This case involved a dead victim with multiple stab wounds of the neck, chest, and abdomen. The

questioned bite mark was found on the left arm just above the elbow surrounding a stab wound.

There was speculation that the suspect might have bitten the victim after stabbing her, which resulted in a sucking type bite mark. However, this was never substantiated.

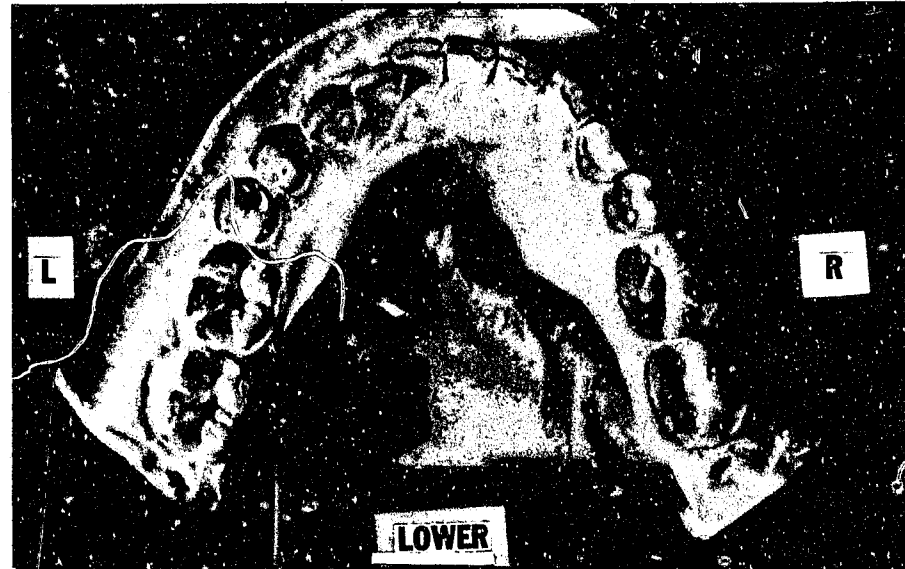


Figure 6. Case No. 1, one to one ratio photograph of suspect's lower dental mold.

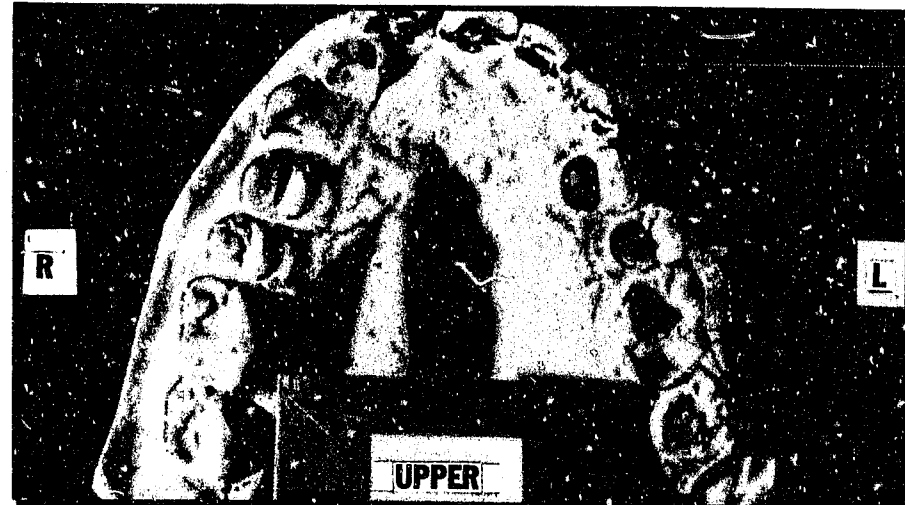


Figure 7. Case No. 1, one to one ratio photograph of suspect's upper dental mold.

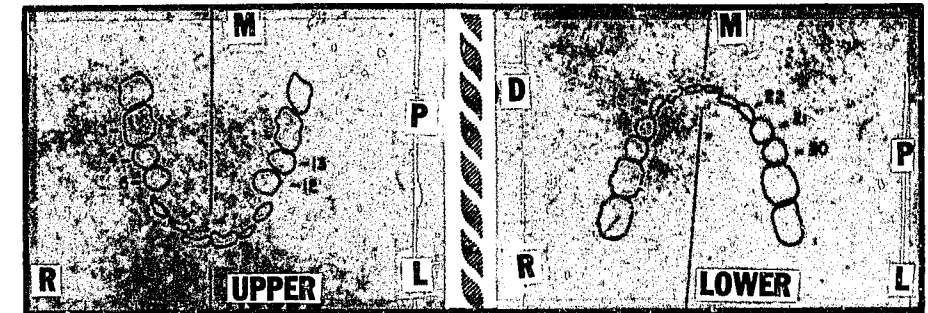


Figure 8. Case No. 1, acetate tracings of both upper and lower teeth as drawn from the one to one ratio photographs of suspects molds.

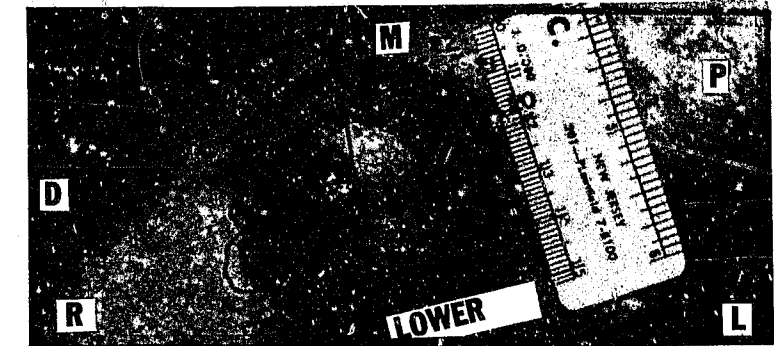


Figure 9. Case No. 1, acetate tracings of lower teeth superimposed over a one to one ratio photograph of a bite mark. The numbers 20, 21, 22, and 27 are standard numbers assigned to the teeth and in this case all four were points of inclusion.



Figure 10. Case No. 1, acetate tracing of upper teeth superimposed over a one to one ratio photograph of a bite mark. Here, numbers 3, 4, 5, 12, and 13 were points of inclusion.

This case was processed by Dr. Irvin M. Sopher, DDS, MD, Chief Medical Examiner, State of West Virginia, formerly a lieutenant colonel assigned to the Armed Forces Institute of Pathology, Washington, D.C. It is also documented in Sopher's book, *Forensic Dentistry*.

Initially, a photograph was taken of the bite mark and a scale. The result was a photograph which made the bite mark life size (see fig. 4). After molds were obtained from the suspect, they also were photographed and duplicate photographs made (figs. 6 and 7).

Sopher then placed transparent acetate sheet film over the photographs of the molds and made acetate ink tracings of the arches (see fig. 8). The transparent tracings were then superimposed upon the original bite mark photograph and the process of inclusion or exclusion was initiated (see figs. 9-11). He then mounted the molds in an articulator from which he made wax bites like the bite registrations mentioned earlier. From these he was able to establish points of measurement between specific contusions.

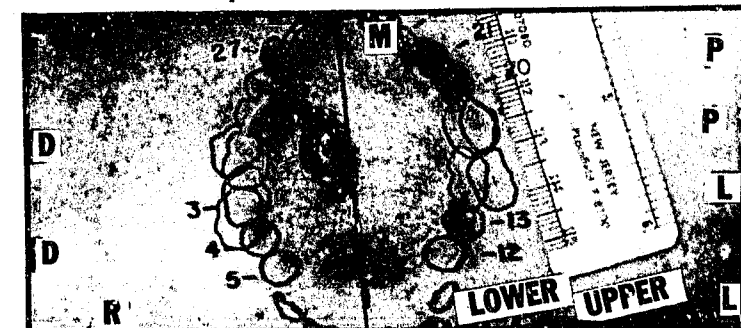


Figure 11. Case No. 1, acetate tracing of both upper and lower teeth in proper alignment superimposed together over the one to one ratio photograph of the bite mark.

Measurements between specific points on the wax as compared to the original photographs of the bite mark were practically identical. The saliva sampling was negative, but Dr. Sopher was able to cite 15 points of exact comparison that existed between the dental molds and the bite mark. He ultimately testified at the suspect's trial.

Case No. 2

A live victim was assaulted in her apartment. The questioned bite mark was located on both inner and outer surfaces of the little finger of the left hand (see figs. 12 and 13). The doctor in this case who did the comparisons was Col. John Jacoway, formerly of the Oral Pathology Section, 10th Medical Laboratory, Landstuhl, Germany.

Photographs of the bite mark were obtained by the local CID office and were sent to the author who was stationed in Mannheim, Germany, with a request that the appropriate evidence be obtained from the suspect who was in pretrial confinement, and that the evidence be evaluated accordingly. Coordination with the local dental facility resulted in a dentist obtaining the bite registrations and dental molds from the suspect. The suspect and his lawyer gave their consent. The registrations and molds were then taken to Jacoway for evaluation.

Jacoway initially made comparisons via measurements of the bite registrations and molds as compared to the bite mark, noting that

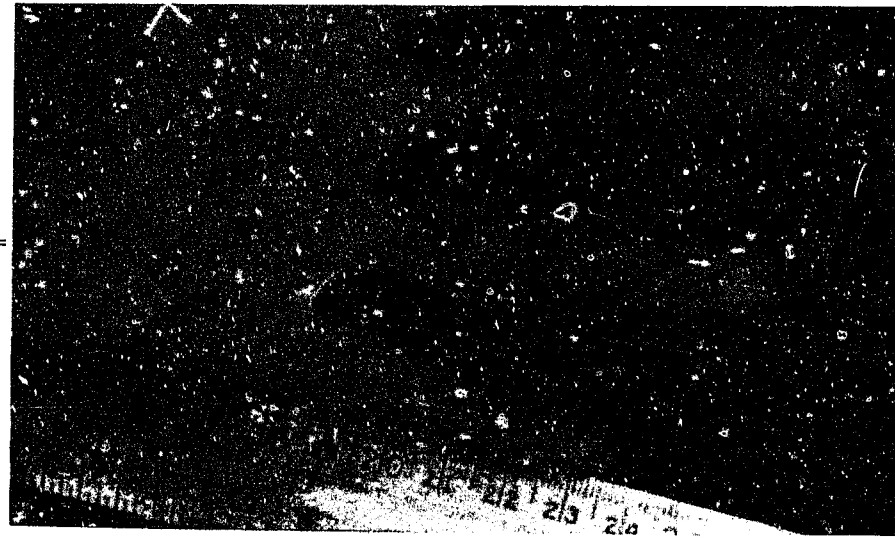


Figure 12. Case No. 2, inner surfaces of little finger on left hand depicting a bite mark near the joint.

the suspect had an overbite of approximately 2mm (see fig. 14). Because this was thought to be beyond the norm, he asked that a survey be conducted at the local dental facility to measure the overbites of its patients. The survey showed that of 100 patients, only 2 percent had an overbite similar to that of the suspect.

The next area of consideration was the chewing configuration seen in the molds (see fig. 15). In other words, as the suspect would chew his food his upper jaw would move off center to the right side. This habit was unique and significant to the point that he created a defect (indentation) in one of his lower

teeth. The high points on either side of this defect measured out to be identical to the two marks found on the outer surface of the finger.

Jacoway then requested that a mold of the victim's finger be made. From this, a cast and numerous wax impressions of the finger were made. Additional comparisons using the wax fingers, enabled Jacoway to duplicate the marks (see fig. 16).

The peaks on either side of the defect in conjunction with the overbite explained the unusual configuration of the bite mark. The measurements added to the conclusion that the person from which the bite registration and molds were obtained was the same person who inflicted the bite mark on the victim's hand.

Jacoway was prepared to testify to his findings, but as related earlier, the suspect made a guilty plea and this evidence was never presented.

One can see from these two cases that bite mark evidence can be an invaluable investigative tool and is almost as good as having fingerprints. In all crimes against persons, the investigator should be alert to the possibility that a bite mark could have been inflicted. To successfully process bite mark evidence, appropriate coordination with the dental facility should be done in advance and the following guidelines should be used.

Victim

- Coordination with the staff judge advocate
- Saliva sample
 - Question, standards, and a blood sample
- Photographs
 - Black and white, as well as color
 - With and without a scale
 - Anatomic site
 - Close and one-to-one ratio
- Impressions of the bite mark
 - Have a dentist perform this task
- Preservation of bitten tissue
 - Coordinate with SJA
 - Have the pathologist excise the tissue
 - Bite registrations and mold from the victim if necessary

Suspect

- Coordinate with staff judge advocate
 - Saliva sample
 - 2 by 2-inch sterile gauze (questioned)
 - 2 by 2-inch sterile gauze (standard)
 - Blood
- Photographs
 - Black and white as well as color
 - With and without a scale, as appropriate
 - Front, open and closed mouth
 - Profile both sides, open and closed mouth
- Examination by dentist
 - Foreign material
 - Charting of teeth
- Bite registration
 - Varying degrees of pressure
- Molds
 - Upper and lower jaws



Figure 14. Case No. 2, dental molds of the suspect depicting the 2mm overbite.



Figure 15. Case No. 2, dental molds of suspect demonstrating the chewing configuration and the defect. The defect and points of concern pertain to the two teeth immediately to the left (viewer's left) of those with the lines drawn on.

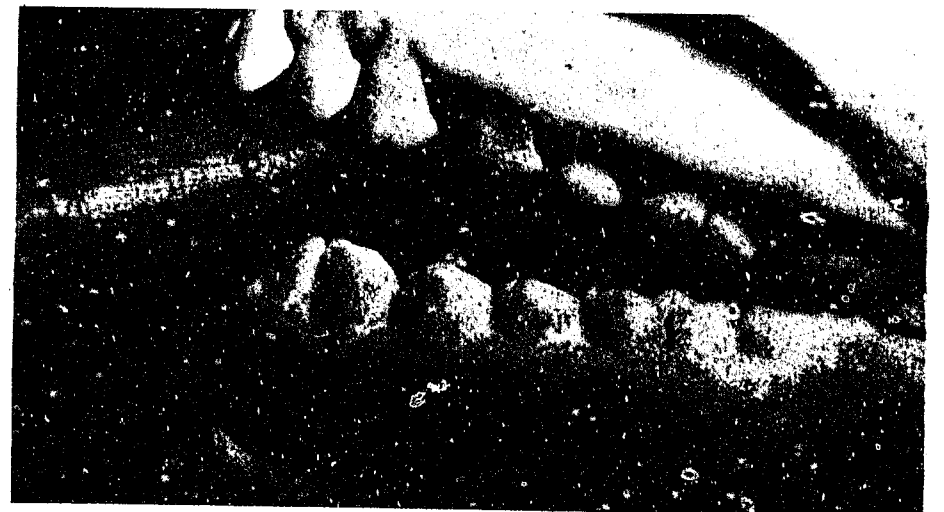


Figure 16. Case No. 2, dental molds with wax finger illustrating the method used to duplicate the bite marks.



Figure 13. Case No. 2, outer surface of little finger on left hand depicting two marks near the fingernail.

END