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Forensic Dental Report

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Introduction

The information in this report details the examination and analysis of the materials received by me via FedEx on November 26, 2008. They were sent by [REDACTED] for review and an opinion.

Inventory of Evidence Received

- I. One (1) FedEx medium box containing two compact disks, one titled [REDACTED] and one titled [REDACTED] Case Suspects. Also included was a two (2) page letter and three (3) sets of models, maxillary and mandibular marked on the base 1, 2, and 3, respectively.
 - A CD entitled [REDACTED] Case Suspects (10.9 MB)
Containing four (4) folders labeled *Evidence, No. 1, No. 2, and No. 3.*
 - I. Evidence (218 KB)
 1. *DSCN3955.jpg* an image of the occlusal view of three sets of suspect models.
 2. *DSCN3956.jpg* an image of the base of the models showing them marked 1, 2, and 3.
 - II No. 1 (3.66 MB)
 1. *Suspect 1.jpg* an image of a scanned maxillary and mandibular model with an ABFO No. 2 scale in place.
 - III No. 2 (3.97 MB)
 1. *Suspect 2.jpg* an image of a scanned maxillary and mandibular model with an ABFO No. 2 scale in place.
 - IV No. 3 (3.05 MB)
 1. *Suspect 3.jpg* an image of a scanned maxillary and mandibular model with an ABFO No. 2 scale in place.
 - B CD entitled [REDACTED] Victim (47.5 MB)
Containing seven (7) jpeg images
 1. *autopsy head-neck.jpg* an image of the head and neck of a female homicide victim. (8.14 MB)
 2. *med closeup L thigh.jpg* an image of a patterned injury on the left thigh with a single leg scale in the photo labeled [REDACTED]. (9.65 MB)

3. *closeup injury.jpg* a close-up image of a patterned injury with a portion of a single leg scale. (6.33 MB)
 4. *closeup injury.jpg* a close-up image of a patterned injury with an ABFO No. 2 scale in place that is labeled [REDACTED]. (6.37 MB)
 5. *stabilized skin.jpg* an image of the stabilized resection of the patterned injury with no scale in place. (5.20 MB)
 6. *skin inner surf.jpg* an image of the stabilized resection of the patterned injury from underside. (5.71 MB)
 7. *transillumination.jpg* a transilluminated image of the stabilized resection of the patterned injury with no scale in place.
2. Bubble wrapped packages
 - a. Containing three (3) sets of stone dental models consisting of a maxillary and mandibular model. Each pair is labeled in black on the base of the model with a "1", "2", and "3", respectively.

Analysis of Injury Evidence

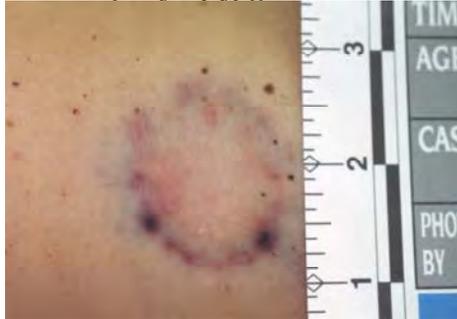
All of the images listed have been analyzed for distortion and where possible corrected to life size using the techniques described in Digital Analysis of Bite Mark Evidence using Adobe Photoshop by Bowers and Johansen.

1. *autopsy head-neck.jpg* an image of the head and neck of a female homicide victim. This is a good quality image and interesting; however it provides no information in regard to the patterned injury.
2. *med closeup L thigh.jpg* an image of a patterned injury on the left thigh with a single leg scale in the photo labeled [REDACTED]. This is a good quality image; however the scale is not in the same plane as the patterned injury (Type II distortion). Additionally, the camera angle is not perpendicular to the patterned injury (Type I distortion).
3. *closeup injury.jpg* a close-up image of a patterned injury with a portion of a single leg scale visible. This is a good quality image. However due to the single leg scale the image can only be rectified to life-size in one axis.
4. *closeup injury.jpg* a close-up image of a patterned injury with an ABFO No. 2 scale in place that is labeled [REDACTED]. A good quality image of a patterned injury. There is some minor type I distortion.
5. *stabilized skin.jpg* an image of the stabilized resection of the patterned injury with no scale in place. This is a good quality image and is interesting. However due to the lack of a scale it provides little usefulness in the comparison of the patterned injury to the suspects dentition.
6. *skin inner surf.jpg* an image of the stabilized resection of the patterned injury from underside. There is hemorrhage noted in the adipose tissue suggesting that the patterned injury was made ante or peri mortem.
7. *transillumination.jpg* a transilluminated image of the stabilized resection of the patterned injury with no scale in place. This is a good quality image, however due to

the lack of a scale there is little value in relation to metric analysis or the comparison of the patterned injury to the suspect's dentition.

All of the images listed were examined, analyzed and considered; however, the following images were determined to be the "best evidence" for further evaluation and analysis.

3.closeup injury.jpg 2.



4.closeup injury.jpg



Each of these images was analyzed and adjusted to life size to be used for comparison with the suspect dentitions labeled 1, 2, and 3.

Throughout this report, the universal tooth numbering system is used.

Analysis of Injury

The patterned injury on the ventral side of the left thigh of the victim has class and individual characteristics that are consistent with a human bite mark. The color of the patterned injury is red to reddish brown. Adequate detail exists to compare the bite mark to individual dentitions to either include or exclude individual suspects.

The biter exerts enough force for the mandibular teeth to make six (6) individual marks and the maxillary teeth make five (5) individual marks.



med closeup L thigh.jpg

Analysis of Bite Mark

The patterned injury has opposing semicircular contusions. There are eleven (11) individual contusions within the semicircular arched areas that can be attributed to individual teeth. There are both class and individual characteristics that are consistent with having been made by human teeth. A detailed discussion of the injury follows using *4.closeup injury.jpg* to indicate each contusion and corresponding individual tooth number. The size of each contusion is expressed by width x height in millimeters.

Bite Mark

Tooth #6 mark 6.2 x 6.6 millimeter round to diamond shape contusion and abrasion compatible with a mark made by a maxillary canine.

Tooth #7 mark 7.3 x 3.7 millimeter rectangular contusion and abrasion compatible with a mark made by a maxillary lateral incisor.

Tooth #8 mark 7.4 x 2.8 millimeter rectangular contusion and abrasion red in color, compatible with a central incisor, but a less distinct shape than tooth #9.

Tooth #9 mark 9.4 x 4.4 millimeter rectangular red contusion and abrasion compatible with a central incisor.

Tooth #10 mark No mark present.

Tooth #11 mark 9.5 x 8.2 millimeter diamond shape contusion and abrasion with a red central area compatible with a maxillary canine.

Tooth #22 mark 7.9 x 5.5 millimeter rounded red contusion and abrasion with a dark round central area compatible with a mandibular canine.

Tooth #23 mark 5.1 x 2.3 millimeter rectangular contusion and abrasion. The mark is compatible with a mandibular incisor.

Tooth #24 mark 5.3 x 2.4 millimeter rectangular red contusion and abrasion with a lighter rectangular central area, compatible with a mandibular incisor.

Tooth #25 mark 5.7 x 2.6 millimeter rectangular red contusion and abrasion with a lighter rectangular central area. This mark seems to be slightly mesially rotated. The mark is compatible with a mandibular incisor that is slightly rotated.

Tooth #26 mark 6.3 x 3.1 millimeter oval red contusion and abrasion compatible with a mandibular incisor. The mark suggests that the tooth is rotated to the mesial and that the mesial edge is behind the distal edge of tooth #25.

Tooth #27 mark 6.1 x 6.0 mm round red contusion with a dark round center consistent with a pointed cusp tip and compatible with a mandibular canine.

The maxillary intercanine distance (*cusp tip to cusp tip*) is 38.1 millimeters. The mandibular intercanine distance is 25.7 millimeters.

Summary of Analysis of Injury Evidence and Opinion

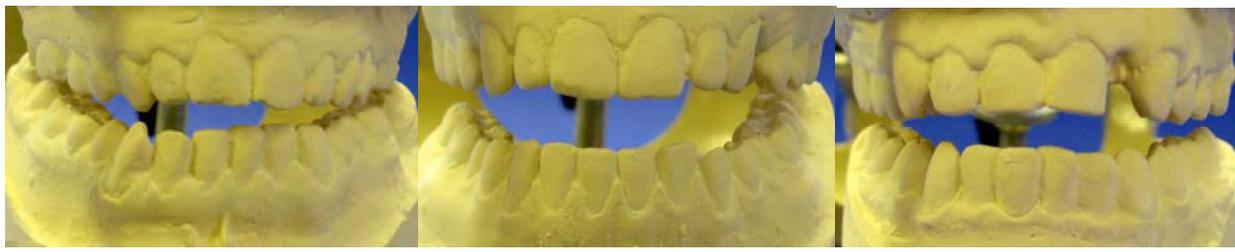
The patterned injury was examined and contains class characteristics and individual characteristics of a human bite mark. There are marks from eleven (11) individual teeth, five (5) maxillary and six (6) mandibular.

The injury is considered to be a cutaneous human bite mark with reasonable medical/dental certainty.

Mechanism of Bite



Suspect Line Up



Suspect 1

**Anterior View
Suspect 2**

Suspect 3

Analysis of Suspects Dentition

The only materials available as evidence from the suspects in this case are three sets of stone dental models, as described in the introduction. All the models show the anterior and posterior teeth well, although some air bubbles are present on the incisal/occlusal surfaces.

Suspect 1

Maxilla:

Fourteen (14) maxillary teeth are present. The arch form is v-shaped and a crossbite exists from tooth number 2 through 7.

Tooth number 1 is not present on the cast provided.

Tooth number 2 is fully erupted and is appears to be decayed and only the mesial marginal ridge is in the occlusal plane.

Tooth number 3 is fully erupted.

Tooth number 4 is fully erupted.

Tooth number 5 is fully erupted.

Tooth number 6 is fully erupted.

Tooth number 7 is fully erupted and has a small chip on the mesial portion of the insisal edge.

Tooth number 8 has a chip on the mesial portion of the incisal edge that extends to the facial.

Tooth number 9 is fully erupted and has a small chip on the mesio-insisal edge.

Tooth number 10 is fully erupted.

Tooth number 11 is fully erupted and has a worn insisal edge that presents flattened.

Tooth number 12 is fully erupted and rotated distally.

Tooth number 13 is fully erupted and appears to be missing part of the mesio-occlusal portion of the tooth,

Tooth number 14 is fully erupted.

Tooth number 15 is fully erupted and appears to be missing all but the mesial portion of the tooth.

Tooth number 16 is appears to be present although partially trimmed away.

Mandible:

Fifteen (15) mandibular teeth are present.

Tooth number 17 is tilted to the mesial.

Tooth number 18 is missing.

Tooth number 19 is fully erupted.

Tooth number 20 is fully erupted.

Tooth number 21 is fully erupted.

Tooth number 22 is fully erupted and has a worn insisal edge presenting flattened.

Tooth number 23 is fully erupted.

Tooth number 24 is fully erupted.

Tooth number 25 is fully erupted and the tooth is slightly rotated mesially.

Tooth number 26 is fully erupted.

Tooth number 27 is fully erupted and rotated distally.

Tooth number 28 is fully erupted.

Tooth number 29 is fully erupted.

Tooth number 30 is fully erupted.

Tooth number 31 is fully erupted.

Tooth number 32 is super-erupted.

Suspect 2

Maxilla:

The model has fourteen (14) teeth present. The arch form is “U” shaped.

Tooth number 1 is not present.

Tooth number 2 is fully erupted.

Tooth number 3 is fully erupted.

Tooth number 4 is fully erupted.

Tooth number 5 is fully erupted and there is a space between it and tooth number 6.

Tooth number 6 is fully erupted with a flat insisal edge.

Tooth number 7 is fully erupted.

Tooth number 8 is fully erupted.

Tooth number 9 is fully erupted.

Tooth number 10 is fully erupted.

Tooth number 11 is fully erupted. It is in crossbite and has a flattened cusp tip

Tooth number 12 is fully erupted and there is a space between it and tooth number 11.

Tooth number 13 is fully erupted.

Tooth number 14 is fully erupted.

Tooth number 15 is fully erupted.

Mandible:

The model has fifteen (15) teeth present. The arch is “U” shaped. The anterior teeth from #23 - #27 are above the posterior occlusal plane.

Tooth number 17 is fully erupted.

Tooth number 18 is fully erupted.

Tooth number 19 is fully erupted.

Tooth number 20 is fully erupted.

Tooth number 21 is fully erupted and has a chip on the mesial portion of the insisal edge.

Tooth number 22 is fully erupted and short of the occlusal plane.

Tooth number 23 is fully erupted.

Tooth number 24 is fully erupted.

Tooth number 25 is fully erupted.

Tooth number 26 is fully erupted.

Tooth number 27 is fully erupted.

Tooth number 28 is fully erupted and rotated mesially.

Tooth number 29 is fully erupted.

Tooth number 30 is fully erupted.

Tooth number 31 is fully erupted.

Tooth number 32 is not present.

Suspect 3

Maxilla:

The model has fourteen (14) teeth present. Although due to the way the model was trimmed teeth numbers 1 and 16 may be present. The arch form is “U” shaped.

Tooth number 1 may be present, however due to the trimming of the model little information exists.

Tooth number 2 is fully erupted.

Tooth number 3 is fully erupted.

Tooth number 4 is fully erupted.

Tooth number 5 is fully erupted.

Tooth number 6 is fully erupted and rotated to the distal slightly.

Tooth number 7 is fully erupted.

Tooth number 8 is fully erupted.

Tooth number 9 is fully erupted and is rotated to the distal slightly.

Tooth number 10 is fractured down to the gingival and no tooth is present in the occlusal plane.

Tooth number 11 is fully erupted.

Tooth number 12 is fully erupted.

Tooth number 13 is fully erupted.

Tooth number 14 is fully erupted.

Tooth number 15 is fully erupted.

Tooth number 16 is appears to be present on the model, although partially trimmed off the cast.

Mandible:

The model has fourteen (14) teeth present. The arch is “U” shaped and the molars on the left side are tilted lingually

Tooth number 17 is not present on the model.

Tooth number 18 is fully erupted.

Tooth number 19 is fully erupted.

Tooth number 20 is fully erupted.

Tooth number 21 is fully erupted.

Tooth number 22 is fully erupted.

Tooth number 23 is fully erupted.

Tooth number 24 is fully erupted.

Tooth number 25 is fully erupted.

Tooth number 26 is fully erupted.

Tooth number 27 is fully erupted.

Tooth number 28 is fully erupted.

Tooth number 29 is fully erupted.

Tooth number 30 is fully erupted.

Tooth number 31 is fully erupted.

Tooth number 32 is not present on the model.

Table 1 graphically details the measurements of the patterned injury on the victim compared to the measurements of the teeth on the casts. All teeth were measured across the incisal surface and are expressed in millimeters. The measurements that most closely resemble the patterned injury on the victim are highlighted. The measurements indicate that **Suspect 3** is the probable biter.

Table 1

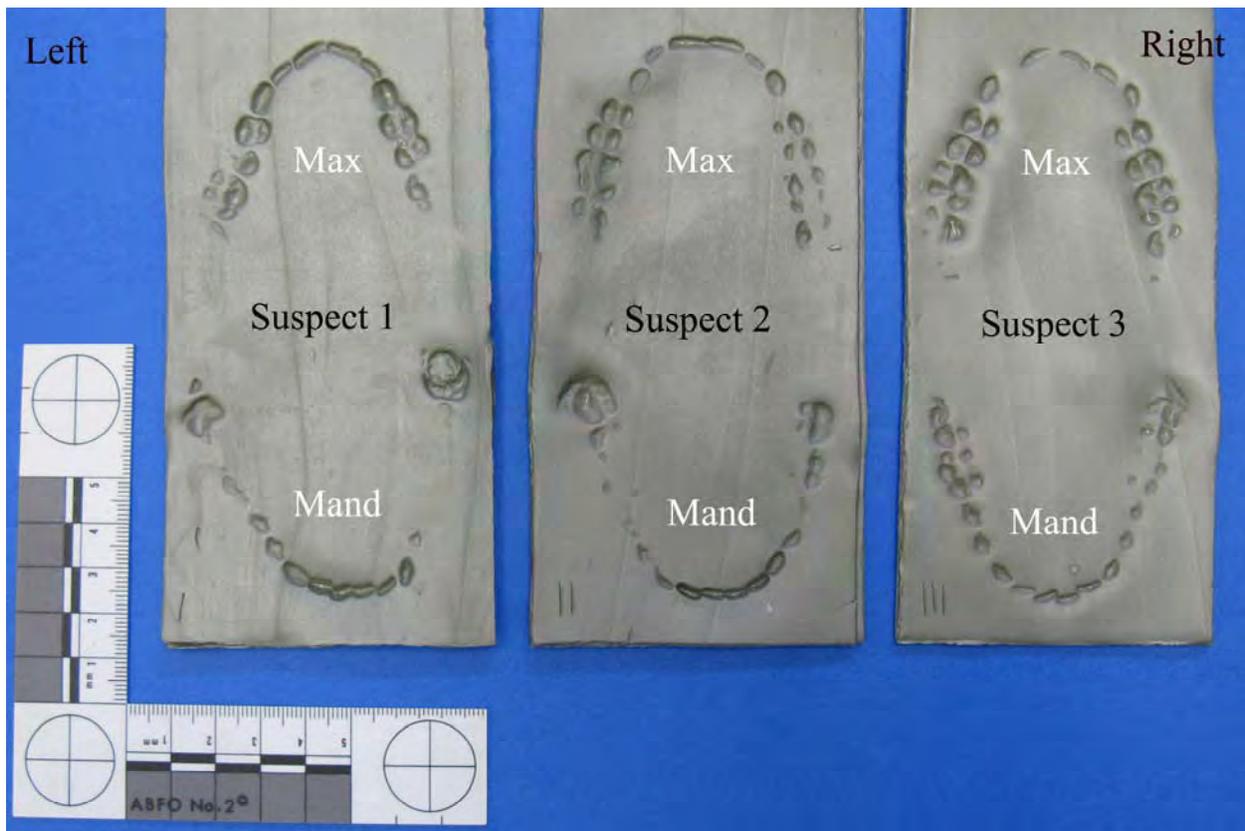
	<u>Bite Mark</u>	<u>Suspect 1</u>	<u>Suspect 2</u>	<u>Suspect 3</u>
<u>Max 6-11</u>	34.1	28.5	31.8	34.6
<u>Tooth #6</u>	6.2	6.2	6.6	7.4
<u>Tooth #7</u>	7.3	5.6	5.5	5.9
<u>Tooth #8</u>	7.4	7.3	7.2	8.5
<u>Tooth #9</u>	9.5	8.0	7.8	8.3
<u>Tooth #10</u>	---	5.4	5.1	---
<u>Tooth #11</u>	9.5	7.2	5.7	7.9
<u>Mand 22-27</u>	26.3	24.0	25.2	25.4
<u>Tooth #22</u>	7.9	6.2	5.8	6.6

<u>Tooth #23</u>	5.1	4.9	5.3	6.1
<u>Tooth #24</u>	5.3	4.8	4.9	5.3
<u>Tooth #25</u>	5.7	4.8	5.0	5.8
<u>Tooth #26</u>	6.3	4.8	5.5	5.9
<u>Tooth #27</u>	6.1	6.5	5.1	6.2

Based on the above analysis the following conclusions can be made:

1. Suspect 1 cannot be excluded as a biter most closely matching 3 out of 14 measurements.
2. Suspect 2 cannot be excluded as a biter most closely matching 1 out of 14 measurements.
3. Suspect 3 is the probable biter most closely matching 10 out of 14 measurements.

Wax Exemplars



Comparisons of the wax exemplars with the bite mark by overlaying the wax exemplar over the bite mark using Adobe Photoshop version 7.01. The wax exemplar's opacity was varied so that the exemplar became transparent allowing for the ability to see through it to the underlying bite mark.

Comparison of the maxillary exemplars and the bite mark allow for the following conclusions:

1. Suspect 1 can be excluded as a possible biter.
2. Suspect 2 can be excluded as a possible biter.
3. Suspect 3 is the probable biter.

Comparison of the mandibular exemplars and the bite mark allow for the following conclusions:

1. Suspect 1 cannot be excluded as a possible biter.
2. Suspect 2 can be excluded as the biter.
3. Suspect 3 is the probable biter.

Hollow Volume Overlays

Comparison of the maxillary hollow volume overlays and the bite mark allow for the following conclusions:

1. Suspect 1 can be excluded as the biter.
2. Suspect 2 cannot be excluded as a possible biter.
3. Suspect 3 is the probable biter.

Comparison of the mandibular hollow volume overlays and bite mark allow for the following conclusions:

1. Suspect 1 can be excluded as the biter.
2. Suspect 2 can be excluded as the biter.
3. Suspect 3 is the probable biter.

Opinion

Considering the totality of the evidence examined and comparisons made, assuming the models are true and accurate representations of the suspects, I conclude that suspect numbers 1 and 2 can be excluded as biters in this case. I further conclude that suspect number 3 is the probable biter. If the population of suspects is limited to the three that I received, I would opine that suspect number 3 is the biter beyond a reasonable degree of medical/dental certainty. If additional evidence becomes available I reserve the right to amend my opinions in this case.

Respectfully submitted,



Adam J. Freeman, D.D.S.