

**Statement of Pretty and Senn
Regarding the Bitemark Evidence in the
matter of
The People of the State of Illinois vs.
Bennie Starks
(Revised)**

May 10, 2010

Materials reviewed

- a) Cover letter from the Innocence Project, 100 Fifth Ave., New York, NY 10011
- b) CD-R labeled: Bennie Starks exhibits
- c) CD-R labeled: Trial Testimony Scoring Sheet
- d) Printed copies of the court transcripts of the testimonies of Drs. Schneider & Hagstrom
- e) Printed copy of the ABFO Scoring Sheet for Bite Mark Analysis labeled as to case name as Starks-Gonzalez [sic] signed and dated 5/12/86 by Drs. Schneider and Hagstrom
- f) Duplicates of two sets of dental models said to be the models of Bennie Starks

1. The Injury

- 1.1. The injury is located on the posterior lateral aspect of the left shoulder of Maria Gonzalez. The injury consists of two semi-circular areas of diffuse bruising with more discrete bruised areas and linear abrasions contained within the central area of the pattern.



Figure 1

- 1.2. The discrete areas of bruising and abrasion have *class characteristics* of patterned injuries produced by human teeth.
- 1.3. It is possible to orient the injury with respect to the maxillary and mandibular teeth responsible.
- 1.4. Using the ABFO guidelines of potential conclusions for determining if an injury is a bitemark it is our opinion that this injury is a *human bitemark with reasonable medical certainty*.
- 1.5. When assessing a bite injury it is essential to consider the forensic significance of the patterned injury. Forensic significance is linked to the number and type of unique characteristics that can be identified within the patterned injury. It is our opinion that there are *insufficient unique characteristics* within this injury to undertake a bitemark comparison leading to a positive identification of a suspect. However, it may be possible, based on the presence of class characteristics, to *exclude an individual*.

2. The method of comparison in 1986

- 2.1. The technique used to produce the overlays in this case by Schneider & Hagstrom, while one of several in use in 1986, has now been shown to be inferior when compared with digital techniques (Bowers & Sweet, 1995).
- 2.2. The technique used is extremely subjective in that the size and orientation of the biting edges of the teeth (as shown in the overlays) is dependant upon the depth that the teeth models are pressed into the wax.
- 2.3. The use of radiographic techniques to produce a transparency is also likely to produce errors of scale – most often enlargement – of the biting edges of the teeth.
- 2.4. It is impossible to ascertain that the overlays provided to us, and used by Drs. Hagstrom & Schneider, are life sized (1:1).
- 2.5. The technique used in 1986 is not currently considered to be the best method of producing overlays and thus the comparison techniques employed in this case would be considered obsolete.
- 2.6. The ABFO scoring system used by Drs. Hagstrom and Schneider was published in October, 1986. The scoring system was retracted by the authors in January, 1988 due to their serious concerns over the potential misuse of numerical values leading to inappropriate statistical assertions being made in bitemark cases.
- 2.7. Despite the problems associated with the ABFO scoring system, it appears that the scoring sheet as used in this case was completed incorrectly.
- 2.8. The photograph used in the overlay comparison process had been scaled to “life size” using a ruler that is not in the same plane with the injury; e.g. the scaling cannot be considered to be accurate as the ruler appears to be placed some unknown distance above the injury. This can be determined from the photograph as the injury is in focus and the ruler is clearly out of focus. In order to produce and verify scaled 1:1 photographs it is necessary to have a rigid scale placed passively on the skin adjacent to and in the same plane as the injury.
- 2.9. Summary of methodology shortcomings:
 - 2.9.1. Outdated overlay production technique
 - 2.9.2. Lack of scale in overlay to allow assurance of proper sizing of overlay
 - 2.9.3. Improper use of the subsequently retracted ABFO scoring system
 - 2.9.4. Improper scale placement in the images used for comparison

3. Communications with Dr. Russell Schneider

- 3.1. During the American Academy of Forensic Sciences meeting in Washington, D.C. in February 2008 both Dr. Pretty and Dr. Senn had conversations with Dr. Russell Schneider regarding the methods used and conclusions reached in the Starks case. Dr. Schneider was asked if he would consider revisiting the case using the more modern techniques currently in use. Dr. Schneider responded to Dr. Pretty that he would undertake repeat analysis using contemporary techniques.
- 3.2. During the American Academy of Forensic Sciences meeting in Denver, Colorado in February 2009 Dr. Senn spoke again with Dr. Russell Schneider and asked if he had revisited the case using the more modern techniques. Also Dr. Schneider was informed that Pretty and Senn had been unable to view much of the original trial material discussed in 4.2 and 4.3 below. Dr. Schneider stated that he would attempt to assist in making any materials still in existence available to Drs. Pretty and Senn for their analysis.
- 3.3. On or around July 17, 2009 Dr. Schneider called Dr. Senn. Dr. Schneider said that he had been in touch with the prosecutors and that no other materials would be made available to Drs. Pretty and Senn for their analysis. During this conversation Dr. Schneider also stated, when specifically asked, that the most distinctive individual features seen in the bitemark in this case, the five linear abrasions outlined in red in the

double image below, were, in his opinion, made by Mr. Stark's four upper incisor teeth and his right upper canine tooth.

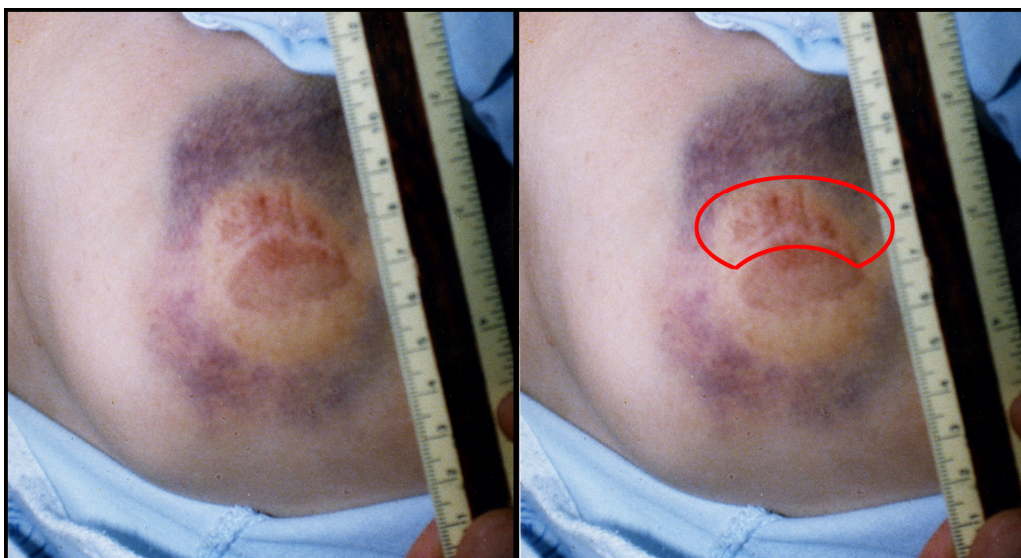


Figure 2

- 3.4. In the same July 2009 telephone conversation, Dr. Schneider told Dr. Senn that after conversations with the prosecutor, it was his understanding that no additional materials relating to this case would be made available for analysis. Dr. Schneider also stated that it was his impression that the bite mark analysis would not play a large part in any additional legal hearings and that if he were asked to testify again he would testify using the same analysis and materials he used in 1986 and would not perform any additional tests or comparisons.
- 3.5. Subsequent to the conversations with Dr. Schneider we were notified that dental models in the possession of the court clerk and "epoxy" models in the possession of Dr. Schneider had been located and would be made available to us. High quality duplicates of these models were made by Dr. Denise Murmann and sent to us for analysis.

4. Conclusion of Drs. Hagstrom & Schneider

- 4.1. Because of the significant limitations expressed above in points 1 and 2; namely that the injury contains insufficient forensic detail and that the comparison technique is flawed, it is our opinion that the conclusions drawn in this case are not supported by the evidence that we have reviewed.
- 4.2. It should be noted that we did not initially have full access to all the materials presented by Drs. Hagstrom & Schneider to the jury, specifically, the dental models of the teeth of Mr. Starks. We subsequently received high quality duplicates of those dental models and have made the analyses. (see 3.5)
- 4.3. In a similar manner we have been able to examine the images of the radiographic overlays generated in this case and compare them to the actual dental models from which they were produced.
- 4.4. Despite the fact that the ABFO scoring system was used to indicate a numerical certainty for their conclusions, Drs. Hagstrom & Schneider have gone beyond the guidelines for conclusions for bite mark comparisons published by the ABFO. They first state on May 13, 1986 that the comparison between the injury and the overlay of Stark's teeth resulted in a "definite match". This was further amplified on July 1, 1986 when they concluded that "...a very specific and unusual pattern leading us to the conclusion that the bite on Maria Gonzalez was inflicted by Bennie Starks Jr."

4.5. The highest level of conclusion afforded by the ABFO guidelines for bitemark comparisons in 1986 was “reasonable medical certainty”.

5. Pretty and Senn Analysis of the Bitemark and the Conclusions of Drs. Hagstrom and Schneider

5.1. The bitemark on the left shoulder was very likely created by a biter who was more behind than in front of the person bitten. The most distinctive features of the injury, the linear abrasions, were likely made by mandibular (lower) teeth not maxillary (upper) teeth as reported by Drs. Hagstrom and Schneider. (See Figure 2 above and Figure 3 below) Figure 3 images are oriented so that the marks reportedly made by upper teeth are at the top and those made by lower teeth at the bottom. The four most distinctive linear abrasions were made by teeth with mesiodistal (left to right) widths that are approximately the same. The class characteristics of upper and lower human incisors are different. The maxillary (upper) central incisors much wider than the lateral incisors while the four mandibular (lower) incisors are of approximately the same width.

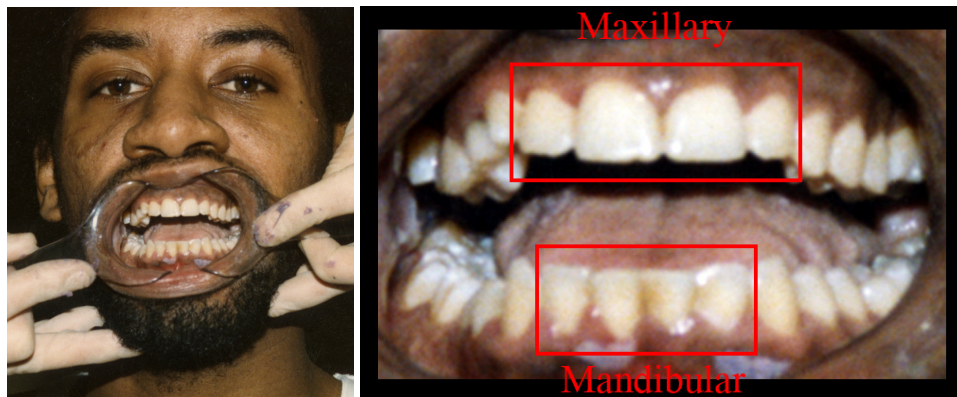
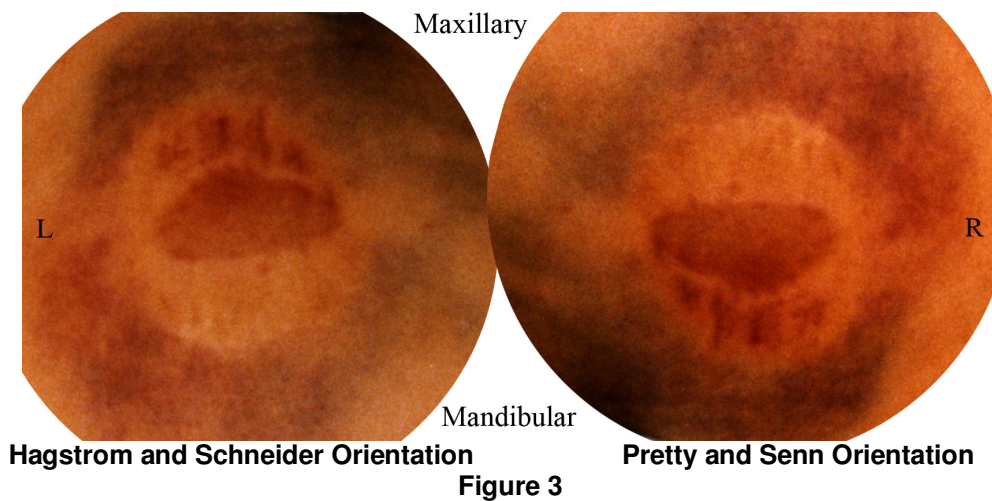


Figure 4
The teeth of Bennie Starks in 1986

5.2. Figure 4 above shows an image and close-up of the teeth of Bennie Starks taken prior to the original trial in 1986. The image clearly shows the contrast between the width relationships of the upper incisors and the lower incisors. Mr. Stark's two (2) upper central incisors are much wider than his two (2) upper lateral incisors while his lower four (4) incisors are of approximately the same width.

- 5.3. The orientation of the bitemark by Hagstrom and Schneider was incorrect. The class characteristics of human teeth are in conflict with their orientation of the bitemark. The maxillary (upper) teeth of Bennie Starks do not exhibit the characteristics purported to have made the linear abrasions that demonstrate the reported "definite match."
- 5.4. The class characteristics seen in the linear abrasions indicate the biter had four (4) mandibular (lower) incisors present at the time the bite was made. This feature indicates that suspected biters who had one or more missing, broken, or malposed lower incisors could possibly be excluded as biters in this injury. Conversely, many suspected biters with all four lower incisors present in normal or near normal configuration could have made the bitemark and could not be excluded.
- 5.5. In addition to the photographs of Stark's teeth in 1986 Drs Pretty and Senn have now had the benefit of viewing replica study models of the teeth (as of 10th March 2010).
- 5.6. These high resolution casts are shown in Figure 5. Careful examination of these casts has not changed the opinions of either Dr Senn or Pretty which are outlined fully in Section 6 below.



Figure 5
High resolution dental casts - a replica of those used by Hagstrom & Schneider

6. Conclusions

- 6.1. The original bitemark reports and conclusions of Hagstrom & Schneider **are incorrect** for the reasons listed above and in 6.5 below.
- 6.2. No system of forensic comparison would support a conclusion of "definite match" without qualification. In addition it is our opinion that the report is not only semantically incorrect but contains errors of analysis and interpretation.
- 6.3. The injury is a human bitemark and contains sufficient detail that may allow exclusion of an individual suspect. There is not sufficient detail in this bitemark to allow a positive identification with reasonable medical certainty. (see 1.5 above)
 - 6.3.1. An individual similar to the one seen in Figure 6 who is missing one or more of his or her lower incisors could not create the mark seen in this case and could consequently be excluded.(see Figure 6)
 - 6.3.2. An individual who had a fractured incisal edge of one of his four lower incisors similar to the fracture seen in the upper tooth in Figure 6 could also be excluded since the marks seen in the bitemark express the full, non-fractured width of the incisal edges of the teeth that made them.(See Figure 7)

6.3.3. The lower incisor teeth are not commonly lost and at least 90% of young men and women in a given population would have all four lower incisors. A very large proportion of these individuals could create a bitemark similar to the one seen in this case. Consequently, very many individuals in a given population could have made this bitemark. The individual depicted in Figure 6 is an exception.



Figure 6

The image of an individual unrelated to this case illustrating a fractured upper incisor and a missing lower incisor. This individual would be unable to create a mark similar to the one seen in Figure 7

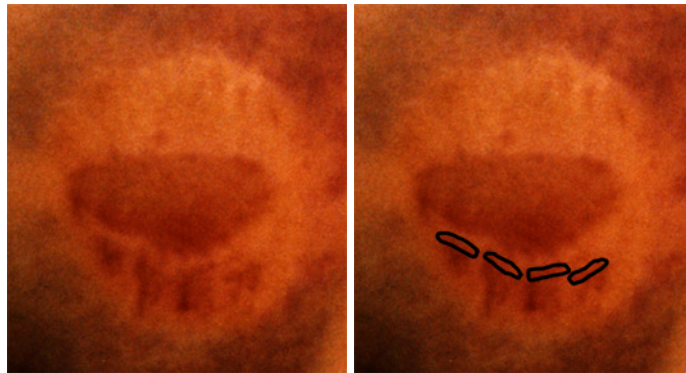


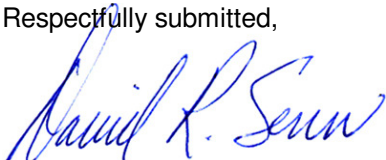
Figure 7

The Bite mark (left) and the same image with outlines of the edges of incisors (right) that could be expected to make this type of mark

- 6.4. The conclusions reached by Drs. Hagstrom and Schneider that Bennie Starks created the bitemark on the left shoulder of Maria Gonzalez are not supported by the odontological evidence seen in this case.
- 6.5. The unsupported conclusions appear to be the result of a combination of the following:
 - 6.5.1. Outdated methodology compounded by refusal to revisit the case using more modern techniques
 - 6.5.2. Inadequate imaging
 - 6.5.2.1. No apparent properly scaled images taken at early stages of the injury
 - 6.5.2.2. No serial photography of the healing injury.
 - 6.5.2.3. Photographs taken at non-optimal projections
 - 6.5.2.4. Improper placement of scales
 - 6.5.3. Improper analyses

- 6.5.3.1. Failure to accurately assess the class characteristics of the linear abrasions seen in the injury
- 6.5.3.2. Improper orientation (by 180^o) of the mechanism of the bite
- 6.5.4. Interpretation Errors
- 6.5.5. Failure to take measures to inhibit expectation bias
 - 6.5.5.1. Only one potential suspected biter
 - 6.5.5.2. No blinding measures implemented
- 6.5.6. Overstatement of association conclusions
 - 6.5.6.1. Conclusions of Drs. Schneider and Hagstrom
 - 6.5.6.1.1. "definite match" (May 13, 1986)
 - 6.5.6.1.2. "...the bite on Maria Gonzalez was inflicted by Bennie Starks Jr." (July 1, 1986)
 - 6.5.6.2. The highest association level published by the ABFO in 1986 was "reasonable medical certainty."
- 6.6. It is our view that, had we been presented the evidence in this case we would not have proceeded to analyse it further than to confirm it as a bitemark. The evidence in the case has a low forensic value and this has been further confounded by the poor evidence collection techniques.

Respectfully submitted,



David R. Senn, DDS, DABFO



Iain A. Pretty, BDS, PhD.