

EXPLORING THE PROBATIVE ROLE OF SOME UNDERUTILIZED 'FORENSIC MARK EVIDENCE' IN SAFE JUSTICE DELIVERY: A GOLD MINE FOR THE DEFENCE LAWYER?

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ABSTRACT

Forensic evidence such as deoxyribonucleic acid (DNA), fingerprints, anthropological evidence, and often document-related evidence is consistently used in Ghana's criminal jurisprudence. However, the forensic application of some impression/trace-related evidence notably lip print, ear print, and footprint in the Ghanaian criminal justice system is challenging. The recent mention of footprint evidence in the ongoing case involving the death of a Member of Parliament in Ghana, Mr. J. B. Danquah, opens a new vista for the use of such underutilized forensic evidence in Ghanaian courts. This paper discusses some selected impression-related evidence, highlights their potential application in forensic investigation and safe justice delivery, and further informs defence lawyers on what to look out for when evaluating such forensic evidence to avoid the miscarriage of justice in criminal cases.

Keywords: Forensic evidence, Footprint, Ear print, Lip print, Defence lawyer, Criminal justice

INTRODUCTION

For the first time in recent history, Ghana's courts have admitted impression-related forensic mark evidence in an indictable trial. On 9th February 2016, Joseph Boakye Danquah-Adu, a 50-year Member of Parliament for Abuakwa North in the Eastern Region of Ghana was allegedly stabbed to death by one Asiedu (first accused) with the assistance of one Vincent Bossu (aka Junior Agogo). He was stabbed multiple times and died from exsanguination according to the pathologist who testified at his trial. As part of the prosecution's case and

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in an attempt to link the accused persons to the crime, a police investigator on 14th July 2022, tendered into evidence both foot and fingerprint evidence. The report which was dated 12th February 2016, was admitted into evidence without any objection from the defence counsel. This was coupled with DNA evidence from artefacts used by the first accused to present evidence of the fact that the 1st accused person had been at the scene of the crime.

DNA Analysis and fingerprint examination are, however, commonplace forensic evidence in Ghana's criminal jurisprudence. For instance, DNA evidence is used in District court cases of child custody and matrimonial causes to ascertain the paternity of children. Fingerprint evidence has also been well used in human forensics. Unlike DNA and fingerprints, the potential of some important forensic mark evidence such as footprints, lip prints, and ear prints in Ghana's justice delivery system remains unexplored. However, the present ongoing high-profile case of *The Republic vrs Daniel Asiedu and Another* (J.B. Danquah-Adu case)³ represents the only case to our knowledge where footprint has been tendered in as forensic evidence by the prosecution. This presents an occasion to dissect the implications of such trace evidence in Ghana's criminal jurisprudence.

Generally, in criminal cases, three things have to be established viz i) a guilty mind (*mens rea*), ii) an unlawful act committed (*actus reus*), and iii) a link between the suspect and the criminal act.⁴ Most often, the prosecution can prove the first two legs i.e. the *mens rea* and the *actus reus*. However, linking the suspect to the crime has sometimes proven elusive. This has led to the unjustified incarceration of persons as has been found by the Innocence Project in the USA.⁵ In Ghana, there is a call that imprisonment is fast becoming a preserve of the poor and socioeconomically disadvantaged. This is because accused persons lack the resources to hire defence lawyers and are thus unable to throw off the evidence the prosecution adduces to link them to the crime. It is therefore the most important link a defence lawyer can use to exculpate their client. In this paper, we seek to provide an exposition on some types of forensic mark evidence that may be useful in crime investigation and suspect identification. We also provide a discussion of the forensic

³ Ghanaian Times, 'J.B Danquah Murder Case Trial Suspended' *Newspaper* (Accra, July 2022)
<<https://www.ghanaiantimes.com.gh/j-b-danquah-murder-case-trial-suspended/>> accessed 26 August 2022.

⁴ Daniel Korang, *Criminal Prosecution in Ghana: Practice and Procedure* (2017).

⁵ <https://innocenceproject.org/> The Innocence project re-evaluates evidence on wrongful convictions in the US and has been successful in using scientific evidence to exonerate persons who have been jailed.

potential of footprint evidence as well as its admissibility in the court of law and how a defence lawyer can take advantage of such evidence.

METHOD

We employed documentary analysis to evaluate mainly newspaper reports⁶ on the J. B. Danquah case. We further obtained peer-reviewed articles and books relevant to the present study from searching the internets and databases such as google scholar and scopus.

UNDERUTILIZED FORENSIC MARK EVIDENCE IN GHANA'S CRIMINAL JUSTICE SYSTEM

Contrary to fingerprint evidence, DNA, odontological, and anthropological evidence, the use of forensic mark evidence such as lip print, ear print, and often footprint in criminal investigation and safe justice delivery is rather minimal if not nil in Ghana. Consequently, there is strong advocacy for the use of the above-mentioned forensic mark evidence as additional instruments in the forensic investigation of crimes.^{7,8} The foregoing is ascribed to the increase in complex crimes as well as the propensity of criminals to take precautions to disguise their tracks when committing crimes.⁹ This section explores a few of the less utilized forensic mark evidence notably lip print evidence, footprint evidence, and ear print evidence, and their potential role in the safe administration of justice. It also examines their limitations and provides a future perspective in this regard.

ADMISSIBILITY OF FORENSIC MARK EVIDENCE

As with all scientific evidence, the courts have to verify the relevance of the mark evidence to the case prior to its admissibility.¹⁰ The two arms of relevance are materiality and

⁶ *ibid.* <https://www.ghanaweb.com/GhanaHomePage/NewsArchive/Finger-and-footprints-of-Daniel-Asiedu-match-samples-taken-by-the-Police-Investigator-1563668>

⁷ Gabriel M Fonseca and others, 'Lip Print Identification: Current Perspectives' (2019) 65 *Journal of Forensic and Legal Medicine* 32.

⁸ Maxwell Abedi, Constance Afoakwah, and Dan Nana Osei Mensah, 'Lip Print Enhancement : Review' (2020) 0 *Forensic Sciences Research* 1 <<https://doi.org/10.1080/20961790.2020.1751396>>.

⁹ Dan Osei Mensah Bonsu, Denice Higgins and Jeremy J Austin, 'Forensic Touch DNA Recovery from Metal Surfaces – A Review' (2020) 60 *Science and Justice* 206.

¹⁰ Section 51 (2) of Act 323 provides that evidence is not admissible except relevant evidence.

probative value¹¹. Materiality refers to how closely related and useful the evidence is to proving the facts in an issue whereas probative value refers to how well the evidence can help prove or disprove a fact in issue¹². In the US case of *Daubert v. Merrell Dow Pharmaceuticals, Inc.*¹³, the US Supreme Court based its decision on Rule 702 of The US Federal Rules of Evidence¹⁴, and laid down the standard for evaluating expert (scientific) evidence in this way:

1. Whether the expert's technique or theory can be or has been tested and not only based on a subjective notion;
2. Whether the technique has been subjected to peer review and publication;
3. The potential rate of error in using the technique;
4. The existence and maintenance of standards and controls; and
5. Whether the technique has generally been accepted in the scientific community.

The import of this, therefore, is that a given technical or scientific evidence, must be well known, objectively derived, and verifiable. The question, therefore, arises as to whether lip print, earprint, and footprint evidence are objectively derived, verifiable, and adhere to well-known scientific procedures. A determination of these characteristics in the various types of evidence would determine their relevance and admissibility. Each mark evidence is reviewed here to provide their probative value.

The probative value of lip print evidence in a criminal investigation

The impression from the human lip can be very influential in solving cases of legal importance. Lip prints are often created at the scene of a crime when the individualistic pattern (grooves and wrinkles) on the labial mucosa of the lips comes into contact with an item of evidence such as clothes, cutlery sets, drinking cups, envelopes, and cigarette butts.^{15,16} Often noted as cheiloscopy or queiloscopy¹⁷, lip prints have prospects akin to

¹¹ Maxwell Opoku-Agyeman, *Law of Evidence in Ghana* (2nd edn, ADMAX Publishers 2015).

¹² S. 179(1) of Evidence Act, 1975 (Act 323)

¹³ Elizabeth A Campbell, 'Expert Witnesses in Civil Cases' in Jennifer Brown and Elizabeth A Campbell (eds), *The Cambridge Handbook of Forensic Psychology* (Cambridge University Press 2010).

¹⁴ https://www.law.cornell.edu/rules/fre/rule_702 Retrieved on 25th August, 2022

¹⁵ Yogesh Vats and Jasmine Kaur Dhall, 'Heritability of Lip Print Patterns among North Indian Populations' (2011) 02 Journal of Forensic Research 2.

¹⁶ Fonseca and others (n 7).

¹⁷ Shally Khanna, NarendraNath Singh and VR Brave, 'Natural Dyes versus Lysochrome Dyes in Cheiloscopy: A Comparative Evaluation' (2010) 2 Journal of Forensic Dental Sciences 11.

fingerprints due to the uniqueness of the grooves and wrinkles present on the labial mucosa of the lip¹⁸. In light of this, the presence of lip print evidence at the scene of a crime may be regarded as circumstantial or corroborative evidence¹⁹ and occasionally as direct evidence when DNA is extracted from the lip deposit for DNA profiling.

The merit notwithstanding, the advent of current legal requirements such as method and technique validation and reliability, limit the applicability and admissibility of lip print evidence in the criminal justice system.²⁰ A major drawback relates to the enhancement techniques used to visualize the print. For instance, reports from existing literature²¹ indicate that latent (invisible) lip prints are enhanced following a pre-application of coloured or visible lipsticks. Although such a laboratory simulated approach may be relevant as proof of concept, it makes the estimation and proper evaluation of lip print evidence challenging since most males do not often wear lipstick except perhaps in winter and/ or harsh weather conditions such as the harmattan season. Further, there is no validated data vis-à-vis the enhancement of lip print from males (who do not wear lipstick at all) and from individuals who wear transfer-resistant lipstick. Whereas the conventional fingerprint enhancement techniques have proved successful in the development of lip prints (made with visible lipstick) in some cases, there exists no current validated technique for the development of lip print evidence. Despite the probative potential for a better justice outcome, the lack of technique validation and quality assurance in this area has inadvertently contributed to the restricted adoption of lip print evidence in the judicial system²².

The probative value of footprint evidence in a criminal investigation

Barefoot mark and shoe mark (or footwear mark) evidence remains one of the most frequently encountered physical evidence at the crime scene and plays a crucial role in human forensics.²³ The human foot has been well explored for the past several decades

¹⁸ Archana Alzapur, Rajani S Nagothu and Hima B Nallur, 'Lip Prints- A Study of Its Uniqueness among Students of MediCiti Medical College' (2018) 72 *Revista del colegio americano de Cardiologia* 2964.

¹⁹ Abedi, Afoakwah and Nana, Dan Mensah (n 8).

²⁰ Fonseca and others (n 7).

²¹ Abedi, Afoakwah and Nana, Dan Mensah (n 8).

²² *ibid*.

²³ Kewal Krishan, 'Estimation of Stature from Footprint and Foot Outline Dimensions in Gujjars of North India' (2008) 175 *Forensic Science International* 93.

for myriads of reasons including forensic and anthropological purposes.²⁴ Forensic examination of a barefoot mark is particularly vital in a developing country like Ghana where perpetrators commit most indoor crimes barefooted. Criminals have the preconception that committing crime whilst barefooted makes them undetectable.

Commonly, footprints can either be 2-dimensional such as those deposited on doors, tile floors, items of furniture, and on the body of a deceased person, or 3-dimensional which comprises print made on a deformable surface (including soil, sand, mud, and snow).²⁵ Footprint evidence recovered from the scene of a crime can be relevant in extrapolating the number of possible suspects at the scene, their path through the scene, their height/ build as well as the point of entry and exit, and thus help to establish the modus operandi of the perpetrator. Hence, the footprint evidence can offer proof and may divulge the skeleton and bodily anatomy of the maker. Even identical twins do not leave identical footprints. This is because there are differences in the way the bones in a foot are aligned coupled with how connective tissues hold the bones in place. These variations in both left and right feet of the same person are the result of both environmental and heredity factors and hence constitute the assumed concept of *footprint uniqueness*.

Forensic examination of footprint involves a systematic comparison between the questioned prints (retrieved from the scene of a crime) and the known/reference print (obtained from the suspect under ideal/laboratory conditions). Ideally, all known samples should be obtained under conditions (substrates and mediums) comparable to that on which the questioned print was made. The primary goal of the footprint analysis techniques is to mathematically measure the lengths, widths, and angles of available bare footprint evidence at the crime scene. These measurements are further contrasted with the corresponding measurements of the suspects in a certain case. Subsequently, an evaluation of the two measurements can provide clues to help narrow down the pool of suspects.²⁶

In any criminal investigation, there should be a standardized and validated protocol to safeguard the collection, preservation, and evaluation of these samples (questioned and

²⁴ Kewal Krishan, 'Individualizing Characteristics of Footprints in Gujjars of North India-Forensic Aspects' (2007) 169 Forensic Science International 137.

²⁵ Krishan (n 23).

²⁶ Richa Mukhra, Kewal Krishan and Tanuj Kanchan, 'Bare Footprint Metric Analysis Methods for Comparison and Identification in Forensic Examinations: A Review of Literature' (2018) 58 Journal of Forensic and Legal Medicine 101.

known samples). Unfortunately, only a few of these methods have, undergone rigorous testing for reliability. Comparison challenges brought on by external factors like different substrate characteristics (soft, hard textured surfaces), mediums (blood or natural sweat/oil), and recovery of just partial barefoot impressions plus measurement reliability issues, are examples of external factors that affect the formation of the questioned print.²⁷ There is a current high level of inconsistency regarding the reliability of techniques used in measuring footprint evidence.²⁸ Therefore, to improve the admissibility of such evidence in a court of law, forensic comparison of "known and questioned footprint" must consider the reliability of all techniques employed during the collection, preservation, and examination of the print.²⁹

The probative value of earprint evidence in a criminal investigation

Earprint forensics (forensic otoscopy) is a tool that has been utilized in crime investigation for over 100 years.³⁰ Earprint evidence is frequently found at scenes of robbery because the thief or robber frequently leaves the print by listening at a window or door. The presence of oils and waxes coupled with sweats from the ear skin forms the basis of earprints at the scene of a crime.³¹ A proof of concept approach has revealed that latent earprints can be enhanced and visualized using conventional fingerprint enhancement techniques.³²

The capability of earprint in crime investigation was first recognized by Hirschi in 1965.³³ The ear begins formation shortly post conception and terminates at an estimated 38th day of fetal gestation.³⁴ Although there will be an increase in size, once formed, the shape of the ear (such as oval, rectangular, triangular, and or round) plus its anatomical features (for example helix, antihelix, tragus, antitragus) remains unchanged throughout the life of an

²⁷ Sarah Reel and others, 'Reliability of a Two-Dimensional Footprint Measurement Approach' (2010) 50 *Science and Justice* 113.

²⁸ J Martin Bland and Douglas G Altman, 'Statistical Methods for Assessing Agreement between Two Methods of Clinical Measurement' (2010) 47 *International Journal of Nursing Studies* 931.

²⁹ Reel and others (n 27).

³⁰ Lynn Meijerman, Andrew Thean and George Maat, 'Earprints in Forensic Investigations' (2005) 1 *Forensic Science, Medicine, and Pathology* 247.

³¹ Lynn Meijerman and others, 'Exploratory Study on Classification and Individualisation of Earprints' (2004) 140 *Forensic Science International* 91.

³² *ibid.*

³³ Meijerman, Thean and Maat (n 30).

³⁴ Vikas Dhanda, Jasvir Singh Badhan and Rakesh Kumar Garg, 'Studies on the Development of Latent Ear Prints and Their Significance in Personal Identification' (2011) 88 *Z Zagadnien Nauk Sadowych* 285.

individual³⁵ except after putrefaction or deformation (such as from burn injury). Thus a detailed examination of the ear is a vital tool in human identification. Further, findings from existing literature have disclosed that the probability of two different individuals having the same earprint details is highly unlikely.³⁶ However, the fundamental assumption that human ears are in reality so distinctive and recognizable that their detail cannot be duplicated is not supported by actual scientific data that is currently in the public domain.³⁷ Furthermore, workers in the criminal justice system may note that currently, there exists no comprehensive and consistent scientific evidence to suggest that ears are unique from one another and that this individuality may be established through forensic comparison. Thus, data regarding the uniqueness of the ear (the basis on which it may be considered in a criminal investigation) remains scanty and less explored.

A case in point is the Mark Dallagher³⁸ case. He was found guilty of murder in 1998, however, an appeal against his case succeeded on account of expert testimony about an earprint evidence used in his conviction. Although forensic experts believed the prints from the crime site and the specimen recovered from the suspect, Dallagher, belonged to the same person, subsequent reviews by experts pointed out that such evidence had no proper scientific basis. He was freed after spending seven years in prison.³⁹ Thus the Mark Dallagher case has become a symbol of the miscarriage of earprint evidence in Great Britain. Consequently, the problem of identification of individuals by their the ear print also remains inconclusive.

FURTHER IMPLICATIONS FOR JUSTICE DELIVERY

Aligning the requirements of the law concerning scientific evidence to forensic mark evidence, it is evident that they must meet the criteria for admissibility as laid down in the Daubert case and must have also followed the laid down procedures for the collection of evidence, used established protocols to analyze their findings, and kept a record of the

³⁵ *ibid.*

³⁶ AJ Hoogstrate, H Van Den Heuvel and E Huyben, 'Ear Identification Based on Surveillance Camera Images' (2001) 41 *Science and Justice - Journal of the Forensic Science Society* 167.

³⁷ PK Chattopadhyay and Shashi Bhatia, 'Morphological Examination of Ear: A Study of an Indian Population' (2009) 11 *Legal Medicine* S190.

³⁸ *R. v. Mark Dallagher* [2002] EWCA Crim 1903 - 25 July 2002

³⁹ Chattopadhyay and Bhatia (n 37).

handling of the evidence to preserve its integrity. This knowledge is important for prosecutors, lawyers and judges in Ghana's criminal justice system.

In trying to connect the accused person to the crime, a savvy prosecutor may use trace evidence as part of circumstantial evidence to piece together a series of acts and events to connect the accused person to the crime. As stated by Pollock CB on circumstantial evidence,

one strand of the chord might be insufficient to sustain the weight, but three stranded together may be quite of sufficient strength. Thus, it may be in circumstantial evidence—there may be a combination of circumstances, no one of which would raise a reasonable conviction, or more than a mere suspicion; but the whole, taken together, may create a strong conclusion of guilt, that is, with as many certainty as human affairs can require or admit of.⁴⁰

We advocate for its use as circumstantial instead of direct evidence because the weight attached to trace evidence may be low considering that the scientific evidence backing it is currently unstable. However, where it is found to have been obtained with some credibility and standard protocol a prosecutor may do well to use it to their advantage.

For defence lawyers, it would be in the interest of their clients to find out how the evidence was collected, what methods were used by the investigator or other expert in collecting the data, how the data was stored, and whether established protocols were used to analyse the evidence. In the J. B. Danquah case, it is currently not possible to estimate whether the chain of command was followed after the footprint evidence was collected. Neither can we ascertain whether the right procedure was used in collecting the footprint. However, the newspaper account, suggests that there was a time lapse between the discovery of the death and when the report was authored. The report was dated a few days *after* the murder. It is assumed that the footprint evidence was collected on the day or close to the day the murder was discovered. It is our firm belief and hope that this was the case. It is also evident from the newspaper accounts of court proceedings on the day the footprint evidence was

⁴⁰ Exall (1866) 4 F & F 922

adduced that there was no objection from the defence lawyer. It is also not evident whether the investigator who adduced the evidence was subjected to thorough cross-examination. In our view, such evidence must be subjected to thorough scrutiny.

A second point of enquiry may be the credentials of the expert who presents the evidence in court. In the Mark Dallagher case, the qualifications of one of the experts who presented evidence on earprint evidence at the trial, was questioned. His rousing review of the practice as an accepted science was debunked on appeal by more knowledgeable experts.

Finally, such trace evidence requires comparison. The defense lawyer would do well to find out whether such a pool for comparison exists at the laboratory where the evidence was analysed (e.g. the Police Forensic laboratory or the Ghana Standards Authority laboratory) or even within the jurisdiction. This would be essential in assessing the weight that ought to be placed on the evidence.

For the triers of fact who may be the judge or jurors, all the points presented above are even more essential for their consideration. Since an expert's opinion is only to assist them in arriving at a decision, it would be expedient for them to thoroughly evaluate the evidence presented in order to uphold the cause of justice.

Ghana's judicial service would also have to work in tandem with the forensic science laboratory of the Ghana Police Service to ensure that a database of forensic experts and evidence is available for verification. Ghana's National Identification Authority has collated the fingerprints of persons with the Ghana card, this could serve as the beginning of such a database for cross-verification of criminal evidence.

CONCLUSION, LIMITATIONS, AND FUTURE PERSPECTIVES

This paper has sought to explore the use of some selected forensic mark evidence in Ghana's jurisprudence and has used the newspaper stories of the admission of footprint evidence in the case of *Republic vs Asiedu and anor* as an anchor to interrogate various forensic mark evidence and their probative value in court. This exercise has been used to point out possible lines of cross-examination for defence lawyers in similar cases.

This paper has explored a developing phenomenon, and also because this paper is based on newspaper accounts we accept that there may be limitations on the knowledge we have

of the trial. We further provide a caveat that we have not in this paper tried to determine the ultimate question before the judge but have only explored the use of a piece of evidence in an ongoing trial from a forensic science point of view. These notwithstanding, we believe that this paper provides useful lessons and food for thought. Further research is required to scientifically explore the forensic role of footprint, lip prints, ear prints, and other impression related evidence in Ghana's criminal justice system. This will aid in enhancing the admissibility of the above-mentioned forensic mark evidence in the justice system.

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