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Importance and Reliability of Ear Print Analysis as Evidence

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Abstract

Ear print analysis has emerged as a significant forensic tool for criminal identification, offering a unique alternative to traditional fingerprint and DNA evidence. Unlike fingerprints, ear prints are difficult to manipulate, making them more resistant to falsification. This paper explores the reliability, techniques, and legal considerations of ear print analysis in forensic investigations. While ear prints have been successfully used to convict criminals in landmark cases such as R v Mark Dallagher (2002) and R v Kempster (2008), concerns about their reliability persist. Variability in ear prints due to pressure, surface texture, and secretion levels raises questions about their admissibility as sole evidence in courts. Additionally, the forensic community lacks standardized methodologies, as seen in cases like State v Kunze (1999), where ear print evidence was deemed inadmissible. Despite these challenges, European crime scene investigations have shown high detection rates for ear prints, particularly in burglary cases. This study highlights the need for improved forensic techniques, expert training, and the establishment of an ear print database to enhance the credibility of ear print analysis. The paper also examines Malaysia's position on ear print evidence, noting a lack of awareness and expertise in the field. While current forensic science debates its reliability, ear print analysis holds potential as a supplementary identification method if further research and standardization efforts are undertaken.

Keywords: *Ear print analysis, forensic identification, crime scene evidence, criminal investigation, biometric identification, forensic reliability.*

Introduction

Forensic science continues to evolve, introducing innovative methods of criminal identification. One such method is ear print analysis, which has gained recognition as a potential forensic tool for identifying suspects at crime scenes. An ear print is a two-dimensional reproduction of the parts of the outer ear that have touched a specific surface and more often than not, criminals had left their ear prints somewhere at the crime scene while committing the crime.

Ear print analysis is currently used as a means of forensic identification in many criminal cases. To researchers, they based their research in ear print analysis similarly to the research of fingerprint as they have common features. For instance, the ear prints and the fingerprints are both taken from the crime scenes and later compared to a database of prints taken from suspects of the crime, therefore, methods used in securing ear prints might not be too different from the methods used for lifting fingerprints. While it is easy for criminals to frame innocent people by manipulating their fingerprints, this might not be the case for ear prints. Therefore, ear prints have bigger role in convicting criminals and the existence of ear prints at the crime scenes must be brought to attention of many to secure rightful convictions and to prevail justice. Ear prints, like fingerprints, are unique to individuals and can be used as biometric evidence. However, unlike fingerprints, ear prints are more challenging to manipulate, making them a compelling

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yet underutilized form of forensic identification.

While ear print evidence has been instrumental in securing convictions, its forensic reliability remains a subject of debate. Factors such as pressure variation, surface texture, and secretion levels can affect the clarity and consistency of an ear print, leading to concerns about its admissibility as sole evidence in court. Additionally, the absence of standardized forensic methodologies has resulted in varied legal interpretations where ear print evidence was deemed inadmissible. Despite these challenges, European forensic experts have successfully used ear print analysis in criminal investigations, particularly in burglary cases. Therefore, this paper explores the importance, reliability, and legal considerations of ear print analysis in forensic investigations.

Methodology

This article employs a legal research approach, utilizing doctrinal legal research to thoroughly examine the admissibility of ear print evidence. Case law serves as the primary reference source, supplemented by an analysis of relevant journals and academic writings. The collected data was critically analyzed to assess the extent to which courts can admit ear print evidence in legal proceedings. This article is primarily based on legal texts from relevant jurisdictions, which serve as key sources of reference (Mohd Zamre Mohd Zahir et al., 2021; Mohd Zamre Mohd Zahir et al., 2019a; Mohd Zamre Mohd Zahir et al., 2019b). For this purpose, content analysis and critical analysis methods were applied (Ramalinggam Rajamanickam et al., 2015; Ahmad Azam Mohd Shariff et al., 2019; Ramalinggam Rajamanickam et al., 2019).

Ear Print Evidence as an Identification Method

Since many years ago, ear prints were found at crime scenes. In fact, there are several landmark cases involving ear prints that led to convictions. In 1965, Hirschi was among the first to discover the ear prints values in convicting criminals (Barnett, 2004). Basically, a latent earprint is produced when the secretions of the ear come into contact with surfaces like wall or glass. Hormones, fats and waxes of the ear itself are things that regulate the secretions. A clear latent ear print can be produced where there are lots of secretions present (Lynn et. al, 2005).

However, it must be noted that a single ear can generate different prints. It depends on several factors such as applied force, duration of listening, quality of listening surface, the lifting process and other factors. For example, the duration of a person listens at a surface affects the appearance of the retrieved ear print. The longer he or she listens, the higher the chances of smudging due to sliding of the ear across the surface. The smudging might raise difficulties in the identification process (Lynn et. al, 2005). Another factor that affects the retrieved ear prints is the quality of the listening surface. Smooth, non-porous surfaces, for example metal and glass appeared to offer the best potential for the recovery of prints that are good. On top of that, varnished wood may also provide better quality ear prints, especially when the paint is not old and porous. However, ear prints recovered from synthetic materials such as polyester or nylon tend to offer a lesser quality ear prints (Lynn et. al, 2005).

Back in those days in the European countries, ear prints were mostly discovered in burglaries cases. At the crime scenes, offenders often leave ear prints on the windows and doors. There are also cases where ear prints were found on window panes of cars. Alternatively, when someone plans to murder or rape another, he or she is likely to leave their ear prints when he or she tries to locate their victim's position. Further, in mass disasters cases, burns, or even drowning where the face of the victims are severely damaged, ears can be used as the identification of the victims

(Kaushal, 2011). The identity can be established through methods based on the morphology and measurements of the victims' ears.

If such a crime or disaster is committed or occurred, the police will begin the investigations and eventually the crime scene officers will process the crime scene. During this process, ear prints should be identified and recognized. The crime scene officers must recover the ear prints found as the ear prints can be of a great help to the investigations. The ear prints contain information about offenders' or victims' ears, representing its anatomical features. It will ease and help the police to discover the true culprit of the crime or even the victims themselves. As for the identification, a comparative assessment can be done to detect the identity of the persons concerned.

Importance of Ear Prints at the Crime Scenes

As far as crime scenes are concerned, the normal routine of crime scene officers is to collect DNA and fingerprint evidence. However, this has been criticized as it is best to keep all options open by collecting all evidences present at the crime scenes such as ear prints. Different crime scenes will have different kind of evidence and all the evidence will not be equally valuable or present. For instance, DNA is sometimes inconvenience as it can be easily planted on the crime scene while for ear prints; it is almost impossible for it to be planted. Ear prints are almost tamper-proof. A person could never plant an ear print of an innocent person at a crime scene without actually bringing the innocent person to the crime scene. Therefore, it is highly relevant for all scenes of crime officers to take the responsibility to collect ear prints at the crime scenes.

It is common for a perpetrator to put his or her ear to a door or window or even a window pane of a car before entering a crime scene. This act is normally done to ensure that the area is not occupied by anybody else. Hence, by using the same method in collecting fingerprints, ear prints can be collected at the crime scenes (World of Forensic Science, 2019). One of the advantages of collecting ear prints is that it can corroborate other evidence found at the crime scenes. Every legal system applies different system but most legal systems require the existence of more than one kind of corroborative evidence for it to confirm that the suspect was present at the crime scenes. As explained before, due to the easy access to fingerprints and DNA of persons, criminals often plant them at the crime scene and frame innocent persons. While as for ear prints, it is not easy to plant it on the crime scene as it is difficult to get an ear print of a person. Furthermore, ear prints are still not a common form of forensic identification in many countries, as opposed to fingerprints and DNA.

In Poland, during investigations at the crime scenes in burglary cases, 88% of ear prints are detected. In 96% of the cases, the prints were collected on objects. For the remaining percentage, the ear prints were found on window panes in car thefts cases. Unfortunately, normally, the ear prints were found accidentally when crime scene officers search for latent. This shows how these officers do not give much attention in securing ear prints at the crime scenes, in the first place.

The relevancy of ear prints at the crime scenes can also be seen in cases where the court had decided convictions based on ear prints evidence. The landmark case on convictions based on ear prints evidence can be seen in the case of *R v Mark Dallagher (2002).* This case had the record of being the first case in which ear prints had successfully been used to prove the prosecution's case. Norman Sarsfield, from the Wakefield crown prosecution service, said that this success can be described as a stepping stone for forensic science. Unfortunately, a retrial was held upon appeal of Mark Dallagher and he was then freed on the basis that a DNA profile

obtained from the ear print found on the crime scene was not Dallagher's. Based on this case, what is important is the fact that the judges nowadays are convinced to consider ear prints evidence as evidence or corroborative evidence in convicting criminals. So, it is highly important for crime scene officers to be aware and take necessary steps in collecting ear prints at the crime scenes as this could be helpful in resolving the case at hand.

Another significant case that involves ear prints is the case of *R v Kempster (No 2)(2008)* where it was held that where a person had left an ear print on a surface, an ear print comparison is capable of providing information which could identify the identity of that person provided that there is a match in that ear print comparison. However, it was accepted that in cases where the only information comes from "gross features" (the main cartilaginous folds), there is likely to be less confidence in a match between prints because of the flexibility of the ear and the uncertainty of the pressure applied, so gross features are capable of providing a reliable match only in cases where they "truly provide a precise match." From this, it can be seen that ear prints at the crime scene is one of the sources of evidence that can be used as an identification method in crimes, hence it is very relevant to collect ear prints at crime scene. The crime scene officers have to become aware of the fact that ear prints exist at crime scenes. They need to be educated in looking on the right places to find the ear prints at the crime scenes. Trainings to recover and lift the ear prints in a better and more effective way are essential as to preserve the evidence from being tampered and/or contaminated. It is also a high time for every country to build database to store the ear prints so that identification can be made easily. Further, the collection of ear prints from criminals must be made compulsory, just the way it is a common procedure to take fingerprints and photographs of the criminals. This will definitely help in matching the ear prints collected at the crime scenes with the database.

Technique of Analysis of Ear Print Evidence

According to the Central Forensic Laboratory of Polish Police (Warsaw), identification of ear prints is carried out in several stages which are: assessment of evidential and comparative material, group identification examinations, contour method and common characteristics methods (Kasprazak, 2001).

Firstly, the assessment of evidential and comparative material involves checking whether the ear prints contain sufficient number of characteristics to enable identification and if it was recovered in compliance with legal requirements. Subsequently the comparative material is checked with respect to the quality. It has to be decided whether material is sufficient for examination and, if necessary, it can be complemented with additional impressions.

Secondly, group identification examination involves comparing sizes and topography of ear prints in evidential trace and comparative traces. At that stage, it is already possible to eliminate the majority of comparative prints, basing on the found discrepancies.

Thirdly, the contour method involves drawing the contour of the ear prints on transparent foil and comparing the contour with the comparative print. This method can be used both in group identification and verification of the common features determination method. This technique allows precise determination of distances and relative location of individual characteristics.

Lastly, the method of determining common features involves comparison of such ear prints parts as helix, anti-helix and anti-helix region as well as concha, tragus, anti-tragus and lobule. The status of individual characteristics can be justified by the type, analysis of anatomy and distribution of the parts of the ears.

Evaluation of Ear Print Evidence

The core question is whether ear print evidence is a reliable piece of evidence? Is it safe to secure a conviction purely based on ear print evidence? There are three major decisions concerning this area and it is important to review them to determine the issues involved when admitting ear print evidence.

In the English decision of *R v Mark Dallagher (2002)*, the ear print evidence was the only forensic evidence against him and therefore played a crucial role in his conviction. The Crown Service Prosecution relied on two expert witnesses; Mr. Van Der Lugt and Prof Vanezis. Mr. Van Der Lugt had no formal qualification but studied ear print identification for at least 10 years. He concluded that based on the 300 different ear prints he had on his database that no two ear prints is exactly the same. When making a comparison, he would be looking for at least five or six points. Based on that comparison, Mr. Van Der Lugt concluded that he was absolutely convinced that the ear print belongs to Dallagher. Prof Venezis however was more cautious and concluded that it was most likely that the print belongs to Dallagher and remotely possible that the print would have been left by someone else other than the defendant. However, he conceded that he could not be one hundred percent certain. Both experts seems to agree that further research must be done regarding ear print analysis particularly on the point whether two different ear print can show obvious similarities

Dallagher appealed on the basis that ear print is unreliable as evidence and therefore should be inadmissible. The defence submitted that current knowledge on ear print evidence is still underdeveloped and has not met a standard that is appropriate to a court of law. The defence relied upon the work of Dr Champod. Champord argued that just because there are major differences between two person's ear print that does mean that two ear prints left by two different people will have major differences. Although the method adopted by both the expert witnesses was scientific, it was subjective and needs to take into account the difference in pressure applied on the window by the person and the possible distortion of the ear tissue. Therefore, even if there is a perceived match between two ear print, it is not clear how much value should be attributed to it. Champod's view on ear print analysis is that it can be used to narrow down the list of suspects but cannot alone be used as an identification method. Further the opinion submitted from Van Der Lugt was biased when he concluded that the print belongs to Dallagher. Whether the print belongs to Dallagher or not was a question of fact to be decided by the jury. To conclude the ear print belongs to Dallagher simply means it must be shown that other ear prints would not have shown the same similarities. This was not done in the case.

The Court of appeal concluded that the ear print was admissible despite the underdeveloped knowledge on the matter. However the issue is the weigh that should be attached to the evidence. His lordship opined that if evidence was presented to cast doubt on the reliability of ear print evidence, the jury might have decided differently. Therefore the conviction was regarded as unsafe.

In another English decision, *R v Kempster (2003)*, McGowan gave evidence as an expert witness. She had 4 years of experience in ear print analysis and was a former finger print officer. She had also completed a course by Van Der Lugt. McGowan concluded that no two ears would be the same and then went on to conclude that the ear print found at the crime scene belongs to Kempster. On cross examination, she rejected the notion that the ear print could belong to anyone else. However the second expert witness concluded based on a high degree of probability that the ear print belongs to Kempster. It is important to note that Kempster did not deny that the ear

mark might belong to him but rejected the accusation that he committed the burglary.

Kempster appeals based on similar ground as in Dallagher, that the ear print evidence was unreliable and had no scientific basis. Defence submitted that if they would have produced expert evidence, the jury would have reached a different conclusion. Court of Appeal admitted testimony by Prof. Champod who gave his opinion on the matter. He was of the view that ear print evidence should be used to exclude suspects rather than to make positive comparison. Furthermore, he opines that the statement of comparison should be limited to statements such as 'the ear print found was consistent with the known impression'. However, this was rejected by the courts because they did not want to limit the expert's testimony as far as the positive comparison is concerned. The Court of Appeal was of the view that although Prof. Champod's evidence might be admissible at trial, it would not have affected the jury's decision. There was also other evidence against him and as such, the appeal was rejected.

The case was then referred to by the Criminal Cases Review Commission, and there was a second appeal. Dr. Ingleby reviewed the work done by McGowan and concluded that there were no precise match and there were some differences. These differences were not attributed to the pressure applied or movement of the ear against the window. In addition, the quality of the ear print obtained was of low quality, it only contains gross details, and as such, Dr Ingleby disagrees with McGowan's view that ear print belongs to Kempster. Although the print only contains gross detail, the judge concluded it was relevant and admissible, and it could be used to identify the accused. However, there should be a precise match taking into account the uncertainty caused by pressure and other factors. On the facts however, there was no precise match. Therefore the appeal was accepted.

In the American case of *State v Kunze (1999)*, the ear print evidence obtained from the surface of the bed room door was the only physical evidence against Kunze. The courts ordered a pretrial hearing to determine whether the ear print evidence was admissible. Michael Grubb from the State Crime Laboratory although had no experience with ear print, claimed that the evidence was accepted by the scientific community. Thirteen experts testified, and only two out of thirteen indicated that ear print was acceptable as a method of identification. Despite this, the judge agreed to admit the evidence and therefore went against the view of the majority of these experts.

During trial, Van Der Lugt gave evidence as to his analysis of the ear mark. There were some matches between certain feature of the ear and the ear print. However there were also a few features where there was no match. Van Der Lugt explained the differences could be caused by the pressure applied. He conceded that there are no agreed criteria on the level of match required to establish a match. It appears to be subjective. Despite this, he concluded that he was one hundred percent confident that the ear mark belongs to Kunze.

On appeal, Court of Appeal concluded that the similarities of class characteristics and between ear prints found at the crime scene and control ear prints may result in expert opinion such as the defendant could have made the ear print or the ear print found was consistent with the defendant or that the defendant cannot be excluded as the source of the ear print found. However to imply a stronger connection, apart from the class characteristics, there must be at least one individualized trait. In order to do so, there must be some specialized knowledge accepted by the forensic community. On review, the court opined that there is significant dispute as to the validity of ear print evidence in the forensic community; the forensic community does not accept the ear print evidence. Therefore, such opinion would be inadmissible.

The ruling applies in situations where individualized traits are used to identify suspects. However, expert opinion can make their observations based on the images available and the similarities or the non-similarities of the ear print found with the suspect's ear print. Opinion can be given on whether the defendant can or cannot be ruled out as a suspect. The verdict was quashed and a retrial was ordered but the charges were later on dropped.

Despite the argument that ear print is a reliable evidence because there is less possibility of contamination or evidence tampering compared to other traditional identification method such as finger print and DNA, the courts are reluctant to secure a conviction based on ear print evidence. There is much doubt as to the accuracy of ear print evidence, and the accuracy of course affects the reliability. There seem to be a risk of misidentifications as far as ear print is concerned. In fact, prints of the same ears are sometimes not identical. Therefore, although there are major differences between two person's ear print, there can also be major differences between the two ear print of the same ear. According to Lynn, much of this is contributed to the pressure applied by the person towards the surface (Lynn et. al, 2005). The pressure affects the quality of the ear print obtained. The type of surface also contributes equally to the quality of the ear print. In fact just because there are significant similarities between the ear print found at the crime scene and the defendant's ear print, it does not mean that the ear print belongs to the defendant. Despite Van Der Lugt's testimony that he was absolutely convinced that the ear print found at the crime scene belongs to Dallagher, the DNA extracted from the ear mark residue later proved that it does not belong to Dallagher. This seriously questions the reliability of the ear print evidence.

Position in Malaysia

In Malaysian, expert opinion evidence is admissible by virtue of section 45 of Evidence Act 1950 if it falls within one of the four categories listed in the section. This includes matters concerning foreign law, science or art, handwriting and finger prints. As per *Chandrasekaran v PP (1971)*, the term 'science or art' would be given a liberal interpretation and therefore it would be sufficient to admit ear print evidence under this limb.

In order to determine whether the evidence is admissible by virtue of S45, the courts will apply the test formulated in *Junaidi Bin Abdullah v PP (1993)*. First the courts will consider whether the nature of evidence requires special skills? If it does, that the courts will inquire into whether the expert witness has the required skills either by academic qualification or skills? The more scientific and complex the subject matter, the deeper the courts will enquire into the qualification or experience of the witness. However, notwithstanding the expert's qualification, the trial judge determines the weight to be attached by such evidence. As per Suffian LP in PP v Muhamed bin Sulaiman (1982), the lack of qualification on the part of the expert evidence does not affect the admissibility but the weight attached to the piece of evidence. However in situations where there is a lack of qualification and experience, and the evidence presented is complex and scientific in nature, the opinion given might be inadmissible. However, in Malaysia it is unknown whether there are experts on ear print evidence. There are also no cases that attempts to use ear print evidence as a mode of identification, indicating that the area is quite new in Malaysia. Expert witness such as Van Der Lugt would be able to give evidence in Malaysia despite not having academic qualification on the subject but has sufficient experience. As such, it would be admissible but the judge will have to attach an appropriate weightage to it.

Legal Issues Pertaining To Ear Print Evidence

The field of ear print is also underdeveloped. There is lack of research concerning the area. There is no sufficient knowledge and expertise on the matter to ensure accuracy in identifying suspects. The methods adopted by the expert witnesses are subjective and there is no one standard method accepted and applied by the forensic community. There is a lack of review of the methodologies adopted by the expert witnesses. Therefore the area is much subjected to individual interpretation by the expert witnesses. As such it is not surprising that the courts in State v Kunze rejected such evidence as being admissible. There is too much of uncertainty in the area. Therefore, it is more appropriate the use ear print evidence as a tool to eliminate suspects rather than making positive identification. In Malaysia, there seems to be lack of experts and awareness as far as ear print is concerned. Enforcement officers are not even trained to look for ear prints, and therefore it is not surprising that there are no criminal cases in Malaysia that has admitted ear print as evidence.

Another important point to note is that a person's ear might undergo changes due to aging and this might further affects the identification process especially in cases where the suspects are caught years after the crime. It is subject to manipulation especially with jewelleries that might be able to alter the shape of the ears. In fact, plastic surgery can also be used to easily change a person's ear structure. In contrast, it is not possible to change a person's finger print through plastic surgery. It is only possible to erase a person's finger print. Therefore, there are serious doubts as to the accuracy of ear print evidence. This of course affects the reliability of the evidence (Anon, 2011).

Conclusion

Ear print evidence is still considered fairly a new technique used in the identification process compared to other techniques such as finger prints and DNA. There seems to be a lack of awareness as to its potential. Its scope is also limited because there seems to be only a handful cases that deals with the issue. The core issue is that whether ear print evidence is accurate and reliable as a tool of identification. There must be further research done on this area and the current techniques must be improvised in order to increase the accuracy and reliability of ear print evidence. If this could be done, the courts would be willing to admit ear print evidence without any hesitation and this could be a powerful tool to convict criminals.

Ear print analysis has emerged as a potential forensic tool for identifying suspects, particularly in burglary and violent crime investigations. Despite its advantages, such as resistance to falsification and its unique biometric characteristics, concerns about its reliability and admissibility persist. Various landmark cases, including *R v Mark Dallagher* and *R v Kempster*, highlight the challenges in relying solely on ear print evidence due to factors like print variability, pressure distortions, and the lack of standardized methodologies. While European forensic practices have seen success in using ear prints for criminal detection, countries like Malaysia still lack the necessary awareness, expertise, and forensic databases to fully integrate this technique into legal proceedings. Moving forward, more research, standardized procedures, and expert training are essential to enhance the credibility and acceptance of ear print evidence in courts. If these developments take place, ear print analysis could serve as a valuable supplementary tool in forensic investigations, aiding in the pursuit of justice.

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