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FORENSIC SCIENCE
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1. Learning Outcomes

After studying this module, you shall be able to-

- Know about the Ear and Lip print
- Learn about the development procedure of Ear and Lip print
- Validity of the Ear and Lip print as a Forensic Evidence

2. Introduction

Lip print

The study of lip prints is called Cheiloscopy. An individual's lip prints are exclusive, alike to fingerprints. Lip prints are rarely used in criminal cases as its credibility has not been resolutely established in our courts. There are two ways of possibly using lip prints:

1. Print patterns for identification
2. Chromatography to match lipstick marks

Identification plays a major role in any crime investigation. The shape of creases on the lips has distinct features like fingerprints. Cheiloscopy is a forensic investigation method that deals with identification of humans depending upon the on lips traces. Larger studies on Lip print has been carried out by various scientists called as tool for human identification in both civil and criminal cases. The lip crease shape exist on the vermilion border of the lip, which is relatively moveable and lip prints may vary in form as per the pressure, direction and method used in making the print. It completes by enlightening the students with the element that the likelihoods to use the red part of lips for identification are extensive than it is commonly thought.

Ear prints

The analysis of ear prints was developed in criminological science. The awakening of forensic interest in the description of ear prints and in identification by means of ear printing is relatively recent. It constitutes one more step in the interminable race between criminal methods and criminalistics science. It is ever harder to find lophoscopic indications of fingerprints at crime scenes, as criminals are becoming increasingly knowledgeable (and the dissemination of criminalistics techniques in the media undoubtedly contributes to this).

3. History of Lip print

R. Fischer (anthropologist) was the first to describe it in 1902, the biological phenomenon of arrangement of furrows on the lips. Edmond Locard in 1932, France (Criminologist) mentioned the use of lip print in identification of individuals. This was earlier suggested by Le Moyne Snyder (1950), in a case where lip print to resolved the case. It was further suggested by Dr. Martins Santos (1960) that lip features can be used in personal identification and also given classification of lip prints.

A detailed study was done by Suzuki (1967) on the measurements of lip prints. He use shades of lip sticks and techniques of its removal for obtaining valuable data for forensic application. Later in 1971 Suzuki and Tsuchihashi, conducted a study and they devised their own classification.

In 1990, Kasprzak conducted research for the period of 5 years on 1500 persons to elaborate the practical use of lip prints. It was during the period 2000-2012 that the study was carried out by several researchers from other countries and also in India.

4. Classification of Lip print

In 1967 Santos was the first person to categorise lip grooves in to four categories:

1. Straight line
2. Curved line
3. Angled line
4. Sine-shaped line

Suzuki and Tsuchihashi, in 1970, developed a grouping method of lip prints:

Suzuki and Tsuchihashi classification

1. Type I: A clear-cut groove running vertically across the lip.
2. Type I': Partial-length groove of Type I.
3. Type II: A Branched groove.
4. Type III: An intersected groove.
5. Type IV: A Reticular pattern
6. Type V: Other patterns.

This organisation is the very generally used for recording the pattern on the lips.

Recording lip prints

Lip prints can be recorded in a number of ways.

1. Photographing the suspect's lips.
2. On a non-porous even surface like a mirror they can be snapped, enlarged and edge tracings made of the furrows.
3. Putting lipstick or other suitable mediums on the lips and then the individuals asked to press his or her lips to a piece of paper or cellophane tape or similar surface.
4. Using a finger printer, preferably a roller finger printer.
5. By having the subject impress his or her lips (without lipstick or other recording medium) against a suitable surface and then processing these prints with either conventional finger print developing powder or with a magna brush and magnetic powder.

5. Development of Lip print

Basic latent print dusting

Mostly regular non-magnetic powder are used by various crime scene investigators as it can be used on various surfaces like on windows, TV sets etc. at burglary scenes. It can also be used on metal file cabinet or metal window frames. Various regular powders are available in market like black, silver/grey, Bichromatic and white. Appropriate color is selected to give appropriate contrast with the background surface in order to have clear picture of the latent print.

Developing the Latent Lip Prints

To record lip prints using the magna brush method, the person should impress his or her lips against a glossy porous surface or a smooth nonporous surface. These lip prints should then be subjected to a heat source until they solidify or should be allowed to air dry. These prints should then be powdered using a magna brush and magnetic powder. Conventional powder methods are usually unsuitable for powdering lip prints, inasmuch as the brush tends to smear or leave streak marks on the print. These streaks may then be interpreted as false characteristics by the comparer. These magnetic powders and magna brush are costly as compared to that of conventional powders.

6. Lip Print in Crime Detection

Just like finger print and teeth, lip print can be used as tool for identification. Lip prints are unique and do not change during life of a person. Traces of lips should be looked for on cutlery and crockery items, on the window or door glass and on photograph or letters. Lip print may also appear on side by side with tooth marks on food products. In practice, lip prints have also seen in the windows, painting, doors, plastic bags and cigarette ends. They can be most frequently seen during murders, rapes and burglaries.

Traces with clear lines and individual elements enable individual identification of human beings. In a sense, lip prints have the same value as dactyloscopic traces. In the case of traces, in the shape of strains the identification examination terminates with group identification; in their character they are similar to other chemical and biological traces.

7. Lip Print in Court of Law

1. Lip print identification is generally acceptable within the forensic science community as a means of positive identification because it appears in the literature.
2. Lip print identification methodology, although seldom used is very similar to finger print comparison and is known and accepted form of scientific comparison.
3. There is no dissent in the forensic science community with regards to either the methodology used or fact that lip prints provide a positive identification.
4. The Federal bureau of investigation (FBI) and the Illinois state police consider that lip prints are unique like finger prints and are positive means of identification.

8. Ear Print Analysis

The outer ear is constituted of a cartilaginous bone structure covered with teguments. The cartilage lamina is folded in on itself, forming protuberances and depressions that give the outer ear its characteristic shape, which has been only too well described in anatomical texts. Descriptions can also be found in the literature of the variations from the norm that can occur due to multiple causes such as abnormalities owing to disease, mechanical or surgical traumas, or aesthetic reasons. Modifications caused by aging have also been described, relating to the increase in the laxity of the tissue, which manifests itself in an increase in the vertical length of the outer ear. There are, furthermore, significant variations due to ethnic origin, particularly with reference to the size of the ears. Diverse methods have been used to systematize the description of the outer ear.

Bertillon made a purely descriptive analysis of its parts. Schwalbe described the form of the helix, the lobe, and six variants of Darwin's tubercle, besides the tragus, antitragus, and the angle of the outer ear to the brain. He designed five imaginary lines on the basis of which he spoke about the morphological index and the physiognomical index. Iannarelli used a system of four lines centred in the tragus for the radial partition of the outer ear into eight areas for comparative purposes.

The ear print is a two-dimensional reproduction of the parts of the outer ear that have touched a specific surface, and that are usually the most prominent regions of the same, that is to say, are most commonly the helix, antihelix, tragus, and antitragus. These types of prints, like fingerprints, are produced by the remains of desquamation, sweat, and grease that the skin leaves on contact with a surface. They are not visible to the naked eye, but are recovered very easily with physical or chemical developers. The most common reason for the prints being left is simple: criminals that are going to burgle a house lean their ear against the door to make sure that there is nobody inside and leave their print on it. The prints may be more or less fragmentary, marked, or well-defined depending on diverse factors such as the degree of greasiness of the skin, the application of the face or hair to the same area, or even the volume of sound that they were trying to hear. It is subsequently necessary to collect the print with a glass slide or methacrylate base. It has been reported that it is possible to determine approximately the height of the suspect by means of the ear print, on the basis of the floor-to-print distance, with certain corrections.

Once the latent print from the crime scene (unknown print) has been developed, we must compare it with a print of the ear of the suspect (known print). In general, three methods have traditionally been used for the comparison of prints: superposition (placing one print over another with transparencies and comparing them); direct comparison; and dissection, dividing the print into sections and interchanging them to check the coincidences and superpositions.¹⁵ The degree to which an ear print represents the original ear can be affected by diverse factors. The size itself can vary, as can the inter-distances between the different points of reference depending on the degree of pressure exerted. The methods of print collection and analysis are designed to attempt to resolve these problems.

Maat¹⁶ proposes a method of quantitative classification, using a polar axis designed/drawn on the basis of a vertical line that is the tangent common to the internal margin of the impression of the antero-superior curvature of the helix and the tip of the tragus. Ingleby¹⁶ uses a similar geometric standardization, but claims that the definition of the polar axis proposed by Maat is difficult to employ in practice. Ingle by therefore calculates it with the use of a computer on the basis of “centroids” (centres of intensity). In any case, the description of the inter-individual variations in the ear print represents a genuine challenge. The solution is outlined through image processing techniques with algorithms that permit us to draw from the print a reliable model of the characteristics of a specific outer ear.

9. Validity of the Ear print as a Forensic Evidence

The forensic validity of the ear print is based on the possibility of identifying a particular ear print as belonging to a particular subject. In practice this can serve to rule out a subject as a suspect, to increase the evidence against a particular suspect or even, if there are no suspects, to search for suspects in future databases. The limitations of the method are obvious, and relate to the uniqueness of the ear print. Furthermore, it is possible for one single ear to leave different prints. This may be due to the manner in which the prints are made, principally, as has been mentioned, to the degree of pressure or the angle at which the ear was applied to the surface, but also to anatomical modifications of the outer ear. As has been mentioned above, attempts have been made to deal with these intra-individual variations with diverse methods of analysis.

The other problem is whether or not two different ears could leave a similar or identical print, or if, on the contrary, there is sufficient inter-individual variability to be able to distinguish between two different ears in all situations. The validity of the method depends fundamentally on the probability of two different ears leaving indistinguishable prints being reasonably small.

In any case, the results of the analysis will be always expressed in terms of probability. Identification by means of ear printing is included amongst the so-called anthropomorphic tests. These are included amongst the body examinations aimed at identifying the accused. What is crucial is to determine the degree of significance that said test should be given as circumstantial evidence. Jurisprudence has accorded the status of probative evidence to the lophoscopic reports that prove, indisputably, that the prints found at the crime scene belong to the accused. However, there is no jurisprudence, nor doctrinal studies, nor studies relating to comparative law on the value that can be given to an ear print found in a particular place.

Legally, there is an important difference between whether the print does in fact irrefutably correspond to the ear of the accused (analogously to fingerprints), or if, on the contrary, it is a print that merely presents similar characteristics to those of the ear of the accused. (In the latter case it would be comparable to a shoe print or the print of a wheel that could be said to be similar to the shoe print or the wheel print of a vehicle belonging to a particular individual.) In the latter case, the probative value of the print would be weaker and more circumstantial elements would be needed to reach the conclusion that a particular person had participated in specific events. In the opinion of the European scientific police, the study of the ear, due to its morphology and characteristics, is an excellent method of personal identification.

It is hypothesized that all ears are different, and that they present a series of characteristics that are capable of leaving prints that are valid for the investigation of certain crimes. Conceptually, the uniqueness of the ear is based on the so-called snowflake paradigm: “nature never repeats itself.” However, it is clear that it is not possible to establish the individuality of the ear empirically, even though in practice it would be sufficient to be able to distinguish between any two ears through a finite number of characteristics. In the United States there have been numerous rulings to the contrary, and identification by ear printing is regarded with great distrust. The Court of Appeals of the State of Washington in 1999 pronounced that “scientific innovation, technical knowledge, or other specialized knowledge can be admitted or can be considered reliable only if, in general, it is considered to be reliable by the technical, scientific or specialist community.

General acceptance can be found in the testimony of whoever affirms it, in articles and publications, in its extended use in the community or in other courts. General acceptance cannot be found if there is significant dispute between qualified experts with respect to the validity of the scientific evidence.” In this case, twelve respected members of the forensic science community declared that identification through ear printing was not generally accepted by the community of forensic science.

Despite the progress made over the last several years, the lack of support in scientific literature is the great weakness of the current state of ear printing identification.

10. Summary

1. The study of lip prints is called cheiloscopy. An Individuals lip prints are exclusive, alike to fingerprints.
2. The analysis of ear prints was developed in criminological science. The awakening of forensic interest in the description of ear prints and in identification by means of ear printing is relatively recent.
3. To record lip prints using the magna brush method, the person should impress his or her lips against a glossy porous surface or a smooth nonporous surface.
4. The ear print is a two-dimensional reproduction of the parts of the outer ear that have touched a specific surface, and that are usually the most prominent regions of the same, that is to say, are most commonly the helix, antihelix, tragus, and antitragus.