Cheiloscopy - An Overview of its Limitations and Future Perspectives

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Introduction

In forensic identification, the mouth allows for a myriad of possibilities. The grooves present on the human lips are unique to each person and can be used to determine identity [1]. The study of these grooves or furrows present on the red part or the vermilion border of the human lips is known as cheiloscopy [2]. Lip print analysis is a process that provides both qualitative and quantitative results thus its application in the forensic field should be widely accepted by both law enforcement and the legal professionals [1]. This article discusses the utility and limitations of lip prints in human identification.

The Procedure

Lip prints at the crime scene can be obtained from glass, cutlery, clothes, cigarette butts, doors, windows etc. Lip prints were first classified by Santos into two categories However Tsuchihashi [4] proposed a separate classification dividing the pattern of grooves into six types (Table 1). This classification considers the best, as it provides more detailing and can be easily understood.

Lipsticks, cellophane tape, white bond paper and magnifying glass were used. Lipsticks are used conventionally to make impressions; however Alvarez and associates [4] have shown that aluminum powder and magnetic powders can also be used to visualize the lip prints. The anatomical landmarks of lip include chelion, stomion, labrale superius and labrale inferius (Figure 1).

First lipstick is evenly applied over the lips, then impression is made from the middle portion of the lip on a strip of cellophane tape on glued portion [1]. These impressions are stuck over white bond paper, these impressions served as permanent record; finally impressions were visualized under magnifying lens according to Tsuchihashi’s classification (Figure 1). To simplify recording lips are divided into quadrants. The Tsuchihashi’s classification and the above described method enable differentiation of lip print pattern between two individuals [4].

Limitations of Cheiloscopy

Lip prints have to be obtained within 24 hours of the time of death to prevent the postmortem changes of the soft tissues. Lip print patterns depend upon whether the mouth is opened or closed. In closed mouth position, lip prints exhibit well defined grooves while in later position of the mouth exhibits ill defined lip prints which may be difficult to interpret. Any pathology of lip such as mucocele, ulceration, chelitis granulomatoso, (Malkersson Rosenthal Syndrome [5]) congenital lip pits, clefts, tumors, etc may alter the pattern of lip prints. Post surgical scars can change the lip print patterns. Ball has stated that the vermilion border of lip has minor salivary glands and edges of lips have sebaceous glands and sweat glands, secretion of oil and moisture may lead to the formation of latent lip prints, which may lead to erroneous data [6].Kavitha, et al. stated that loss of support due to loss of anterior tooth may alter the pattern of lip prints [7].Any debris on lip surface may alter the lip print recording [8]. Application of thick layer of lipstick and over stretching of the cellophane on the lip surface may alter the recordings. Anatomic position of labial grooves close to vermilion border is a movable zone, so the prints made may differ in the appearance depends upon the pressure applied and the direction of the pressure [8,9]. Bajpai M and associates discussed the inter observer variability which may influences the lip prints recording [1].

Future Perspectives

Although lip prints are unique to individual like fingerprints but further studies are needed to address the uniqueness of lip grooves also more human characteristics should be included like post surgical scars, crusting of lips, congenital lip pits, cleft etc [10].

References


Table 1: Tsuchihashi’s classification.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>Clear cut vertical grooves that run across the entire lip</td>
</tr>
<tr>
<td>Type I’</td>
<td>Similar to type I, but do not cover the entire lip</td>
</tr>
<tr>
<td>Type II</td>
<td>Branched grooves</td>
</tr>
<tr>
<td>Type III</td>
<td>Intersected grooves</td>
</tr>
<tr>
<td>Type IV</td>
<td>Reticular grooves</td>
</tr>
<tr>
<td>Type IV</td>
<td>Grooves that cannot be morphologically differentiated</td>
</tr>
</tbody>
</table>

Figure 1: Anatomical landmarks of lip.


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