

Cheiloscopy and Rugoscopy in Forensics-A Review

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ABSTRACT

Human Identification is a very important process in Forensic Investigations. Accordingly, Lip Prints and Palatal Prints plays a crucial role in identifying an individual person. In sex determination cheiloscopy and palatoscopy helps to find out the person and it can produce in front of court of law. It is helpful in finding the missing individual and it can be applicable in mass disaster instances.

Key Words: Cheiloscopy, Rugoscopy, Identification, Disaster.

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How to cite this article: Arthanari A, Priyadharshini R, Sinduja P, Cheiloscopy and Palatoscopy in Forensics– A Review. *Int J Clinicopathol Correl.* 2022; 6:1:12-15.

Submitted: 25-Feb-2022 **Revised:** 13-Mar- 2022 **Accepted:** 05-Apr-2022 **Published:** 13-Jun-2022

Introduction

In forensic investigations, determining a person's sex is unavoidable. In mass disasters or missing person instances, a variety of procedures are used to identify an unknown individual. Visual Identification and gender determination may not be possible through examination. Especially if the body has been severely decomposed. However, it is not always possible to gather or use circumstantial evidence (1). Lip prints are distinctive patterns of fissures in the shape of elevations and depressions found in the zone where the inner labial mucosa meets the outer skin. Cheiloscopy is the study of lip prints. This is similar to fingerprints in that it is unique to an individual (2). According to Vahanwala's classification, males and females have different lip print patterns. They are supposed to be one of a kind and can be identified as early as the sixth week of the foetal stage. They are also said to be permanent, resisting climate change, small injuries, and inflammation, among other things (3). Palatal rugae are asymmetrical, uneven mucous membrane ridges that extend laterally from the incisive papilla and the

anterior section of the median palatal raphe (4). Rugae are one-of-a-kind, unchangeable, and classified. Males and females have distinct rugae patterns in terms of shape, quantity, branching, and unification. It first appears in the third month of an embryo's development and lasts for several days after death (5).

At both the social and legal levels, human identity has become critical in all aspects of human relationships. The most common procedures used for identification include dental identification, fingerprinting, and DNA analysis. These, however, may not be appropriate in all situations (6) (7). As a result, alternative, less well-known methods of identification, such as cheiloscopy and rugoscopy, must be used.

Palatal Rugae Analysis in Forensic Odontology

Palatal rugae analysis may be useful in forensic odontology since they are consistent in shape, individual's life, with the exception of size pattern, direction, and unity throughout that changes due to palate expansion. Because of

their inside position, they are highly shielded against heat, chemicals, and damage. In research by Muthusubramanian et al., it was discovered that 93 percent of the palatine rugae in participants with third-degree panfacial burns were normal (8). In 77 percent of the human cadavers, the authors found no alterations in the colour or surface anatomy of the palatine rugae. They came to the conclusion that the palatine rugae could be employed as a reference landmark in forensic identification (9).

Classification

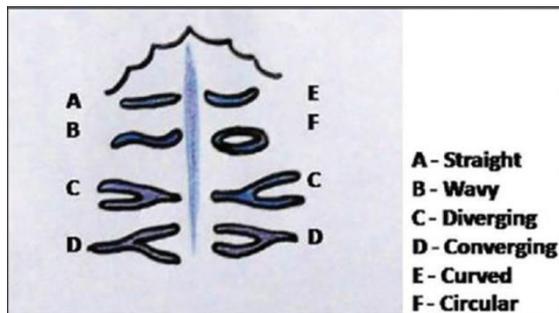


Figure 1: Shows the Palatal Rugae pattern

1. The first system of classification was developed by Gorla (1911) (9)

The rugae pattern was divided into two types-

- Specifying the number of rugae
- Specifying the extent of rugal zone relative to the teeth
- Further distinguished rugae into 2 types-
- Simple or Primitive • More developed

2. According to Lysell (1955): (10)

Palatal rugae were classified depending on its length

- Primary: 5mm or more
- Secondary: 3-5mm
- Fragmentary: 2-3mm
- Rugae smaller than 2mm are disregarded

3. Modification of Kapali's classification: (11)

- Converging

- Curved
- Wavy
- Straight
- Circular
- Furcated

4. Carrea classification: (12)

Based on form of the palatal rugae

Type I: Posterior-Anterior directed rugae

Type II: Rugae perpendicular to raphe

Type III: Anterior-Posterior directed rugae

Type IV: Rugae directed in several directions

5. Da Silva Classification: (13)

Based on shape Palatal rugae classified into two types-

- Simple: Numbered from 1-6
- Composed: Resulting from combination of 2 or more rugae patterns

Classification Rugae type

1. Line
2. Curve
3. Angle
4. Circle
5. Wavy
6. Point

Cheiloscropy In Relevance to Forensic Odontology

Cheiloscropy is the examination of a series of elevations and depressions on the lips that produce a distinctive pattern known as lip prints. Lip prints, like fingerprints, are permanent and constant, and thus unique to each person (unless in rare cases). A variety of

lip print classifications have been devised, such as Renaud's, which defines ten types of lip prints, each denoted by a letter from A to J, with capital letters applied to the upper lip and lowercase letters used to the lower lip (14).

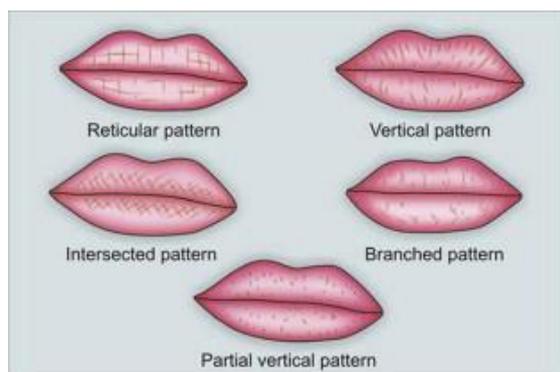


Figure 2: Types of Lip Print patterns

The lower lip morphology can also be beneficial. When it comes to determining gender, Females have an important role in this environment. A vertical or intersection-shaped lip is more common. Lip print patterns that are ramified or reticular are more common in Males with a higher prevalence (15).

Comparative Anatomy of Cheiloscropy and Palatoscopy

The possibility of post-mortem modifications in lip prints from cadavers with varied causes of death must also be considered. Utsuno et al analysed these modifications and came to the conclusion that a proper identification was not possible (16). The target rate was met. However, this research was conducted in a controlled environment. Lip prints in a laboratory setting and what happens to them acquired from cadavers who have been exposed to the natural environment is still inconclusive. It should also be noted that only in very rare circumstances is there any antemortem data on lip prints, and if so, what is it? Obviously, necro identification degrades a comparative study. The presence of teeth is the most important criterion for dental identification ante mortem data, which Cheiloscropy cannot provide. Therefore, Cheiloscropy will only be used to match lip prints to the lips that are being studied (17). (2). Fisher was the first to report lip prints in 1902 However, it wasn't until 1930 that de

Lille published several investigations that led to the usage of lip prints in criminology (2). Suzuki and Tsuchihashi created a classification system that divided lip groove patterns into six categories, as well as naming the wrinkles and

grooves seen on lips as 'sulci labiorum rubrorum.' Lip response to trauma; in fact, these researchers found that after healing, the lip pattern was identical to what it was before the damage (18).

Conclusion

Sex determination in crime scene of unknown or missing dead body is time consuming. This study is a short review on palatal rugae and lip print patterns in various individuals. Both methods are reliable equally in sex determination.

Financial support and sponsorship

Nil

Conflict of Interest

There is no Conflict of interest

Acknowledgement

Nil

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