

Original Research Article

## **Study of palatal rugae patterns and its prevalence as an aid in the identification of individuals in forensic sciences**

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**Abstract:** Establishing the person's identity is an important and complex process. It is usually done in the forensic study by the use of various anatomical landmarks. Palatal rugae are one of the anatomical landmarks. It is different in each individual and it remains constant throughout the life of the individual. The present study was done to study the prevalence of the palatal rugae patterns. The study was conducted in the department of forensic sciences and general anatomy jointly. A total of 120 subjects, including of 60 males and 60 females were taken for the study. The patients coming to the OPD were selected randomly and taken for the study. The palatal rugae on the cast were delineated with the help of sharp tip HB pencil under adequate light on the cast made from the impression. The most prevalent type of rugae in both males and females was curved (40.82%) followed by wavy (24.03%), straight (18.34%) and diverging types (6.97%). The diverging type was present in 54 rugae, nonspecific in 34 rugae and converging in 28 rugae, out of the total rugae examined. Different types of pattern seen in the individuals can be used as reliable guide in the forensic study.

**Keywords:** Forensic medicine, General anatomy, Palatal rugae.

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### **INTRODUCTION:**

Nowadays, human identification is becoming fundamental in all aspects of human relationships, at both social and legal levels. It allows people to preserve their rights and have their duties demanded from both civil and legal standpoints. Identification matches to a combination of various procedures to individualize a person or an object [1]. Identification of an individual is a requirement for certification of death and for personal, social and legal reasons. Human identification is a backbone of civilization, whether in living or dead, and the identification of unknown individual has always been of paramount significance to our society. Human identification is based on scientific principles chiefly involving fingerprints, dental records and DNA analysis. Limitations to the use of fingerprints occur in situations where the hands are charred or mutilated [2].

At birth, the palatine rugae are predominantly well-formed, and the pattern of alignment typical for the individual person is present. Palatine rugae can also be used as internal dental-cast reference points for quantification of tooth migration in cases of orthodontic treatment. They have been found stable in position even after the orthodontic treatment involving premolar extractions and then the retraction of anterior teeth [3]. The present study was done to study the prevalence of the palatal rugae patterns.

### **MATERIALS AND METHODS:**

The study was conducted in the department of forensic sciences and general anatomy jointly. A total of 120 subjects, including of 60 males and 60 females were taken for the study. The patients coming to the OPD were selected randomly and taken for the study. The institutional ethical committee consent was

obtained before start of the study and informed written consent was taken from all the participants.

**Inclusion criteria:**

- Subjects were selected randomly.

**Exclusion criteria:**

- Subjects with braces, removable partial denture, fixed partial dentures.
- Subjects with abnormalities of the lips and palate.

Maxillary impression of all the subjects were made using alginate in a perforated impression tray and cast was obtained using high strength dental stone. The palatal rugae on the cast were delineated with the help of sharp tip HB pencil under adequate light. Kapali *et*

*al.*; classification (1997) were used for the record of the rugae pattern as straight, curved, wavy and circular. Thomas and Jotze in 1983 classification were used for the unification/ branching and nonspecific. Unification further classified as covering or diverging, depending their origin.

**RESULTS:**

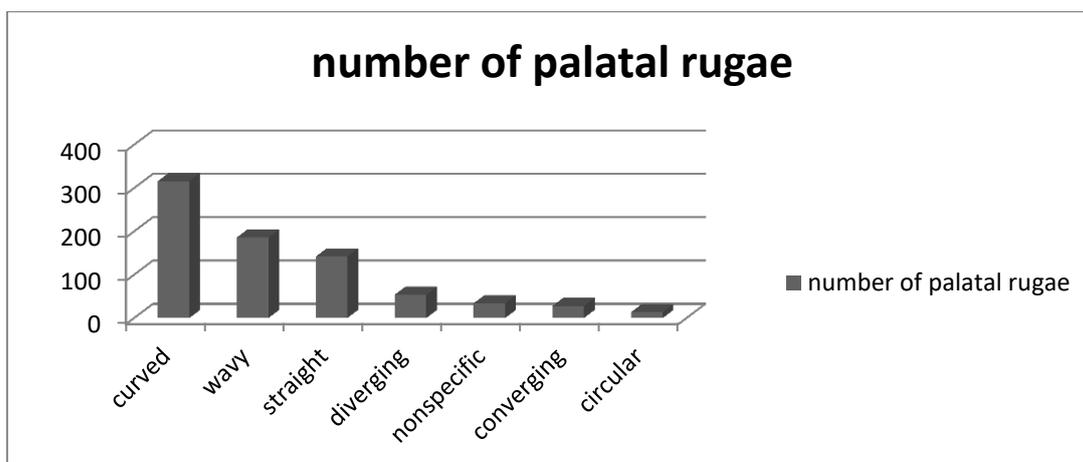
The mean number of rugae was slightly higher in females than males. The average number of rugae found was 6.45. (Table 1) The most prevalent type of rugae in both males and females was curved (40.82%) followed by wavy (24.03%), straight (18.34%) and diverging types (6.97%). The diverging type was present in 54 rugae, nonspecific in 34 rugae and converging in 28 rugae, out of the total rugae examined. (Table 2, Graph 1)

**Table 1: Prevalence of palatal rugae in males and females**

Gender	Total number of individuals	Total number of rugae	Mean number of rugae
Male	60	381	6.35
Female	60	393	6.55
Total	120	774	6.45

**Table 2: Prevalence of different types of rugae**

Types of rugae	Number of rugae (%)
Curved	316 (40.82 )
Wavy	186 (24.03)
Straight	142 (18.34)
Diverging	54 (6.97)
Nonspecific	34 (4.39)
Converging	28 (3.61)
Circular	14 (1.80)
Total	774



**Fig 1: Graphical representation of prevalence of different types of rugae**

**DISCUSSION:**

Rugae are the anatomical folds that are located on the anterior third of palate behind the incisive papillae. They are also known as "Plica palatine," and the study of these patterns is called palatoscopy [4]. Under the protection of lips, cheeks, tongue, teeth, bones and dentures, palatal rugae can protect against trauma, high temperature and decomposition, and is less susceptible to trauma and injuries. In the human lifetime, the length of palatal rugae may change but the location maintains unchanged. It is generally acknowledged that the palatal rugae pattern is permanent like fingerprints and cheilogramma; it never alters by disease, trauma or chemical corrosion. Palatal rugae pattern is unique among individuals, even between twins. Palatal rugae pattern is mediated by genetic genes, showing various characteristics among population and retains unchanged in each individual [5].

Our study showed that the females had slightly more number of palatal rugae than males and the most common pattern found was the curved shape followed by the wavy pattern. This was in accordance to the study done by et al, who showed that the wavy, curve and straight patterns were predominantly common while circular and unification of rugae were less common. There was an insignificant gender differences in the total number of palatal rugae, shape and length of rugae amongs male and female students [6].

**CONCLUSION:**

The uniqueness and overall stability of palatal rugae suggests their use as a viable alternative for forensic identification in different groups. Hence, the study of palatal rugae is one of the simple and reliable tools for population identification in forensic science.

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