

# Comparative study of palatal rugae among complete dentulous and edentulous population in Mangalore

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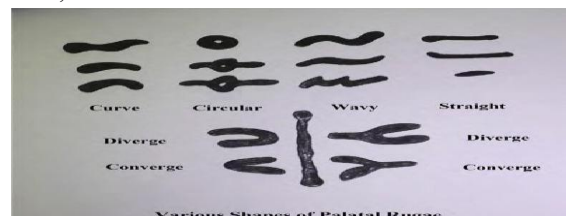
**Abstract**—The examination of palatal rugae pattern is done among the dentulous and edentulous casts, the photographs were taken. The research of palatal rugae is conveyed to be analytically acceptable for human identification in dentulous and edentulous participants. Data analysis was done; a graph was prepared. Both groups did not have an evenly distributed rugae pattern. Dentulous group has a higher percentage of intricate rugae patterns, while edentulous group had rugae patterns that were more simplistic.

**Index Terms**—Palatal rugae, Dentulous, Edentulous, Forensic Odontology, Forensic Dentistry

## 1. INTRODUCTION

Forensic odontology, also referred as forensic dentistry, is a branch of forensic science that studies dentistry and the use of dental evidence in criminal and civil law. Justice will be served by outlining how dental evidence should be handled, examined, and assessed. These kinds of evidence, which are gathered from teeth, aid in identifying and determining the age of the individual to whom the teeth belong. The human body's toughest tissue is found in the teeth, which can survive fire, chemicals, and other elements that expedite the ageing process. In the interest of justice, dental evidence shall be handled, examined, and evaluated appropriately. The idea that no two mouths are same, including those of identical twins, is at the core of forensic dentistry. Dental records are kept by most people, and they can be created by making an impression of a person's teeth. It is possible to compare the bite marks and impressions from these dental records of the teeth that have been found on bodies or at crime scenes. Identifying human remains from crime scenes, including fragmented bodies. It is a task that forensic odontologists help investigating authorities with can be compared to bite marks discovered at the murder scene or teeth discovered on a body. These kinds of

evidence are collected from upper maxilla and aid in identifying and determining the age of the person whose teeth are present. Teeth are among the toughest tissues in the human body and can endure fire, toxins, and other things that cause the body to age. They can be created by taking a person's tooth impression and are extremely useful in the identification of individuals in natural or man-made disasters, particularly in explosions, fires, terrorist attacks, decomposing, damaged, or charred victims where there is very little human tissue. One of the most effective and extensively used methods of identification is the collection of post-mortems and antemortem dental records from unidentified victims. Odontologists assist investigating authorities in identifying human remains from crime scenes, as well as entire corpses and numerous casualties from catastrophes like earthquakes, tsunamis, mass crimes, road, and rail accidents.<sup>[1]</sup>



## Importance of Palatal Rugae Forensic Odontology

It is being examined if rugoscopy, or the examination of the oral rugae, may be used to help identify people. This procedure offers a number of benefits, and a thorough grasp of the many forms of palatal rugae and the numerous tools available for investigation may be helpful.<sup>[8]</sup>

## Forensic significance

Forensic identification can make advantage of the stability and post-mortem resilience of the palatal rugae. When compared to various body sections, the morphological pattern can be helpful in forensic science in situations of mutilation.<sup>[9]</sup>

## 2. LITERATURE REVIEW

PRIYADARSINI et.al (2022) studied about the rugae pattern dentulous and edentulous models -A Comparative study. <sup>[10]</sup>. GANESH SOMASHEKARACHAR et.al (2021) studied about the evaluation and comparison of different palatal rugae patterns of dental results in the interest of justice. JAGDISH PRASAD RAJGURU et.al (2014) studied about the Comparative rugoscopic study of dentate and complete edentulous individuals in the south Indian population. <sup>[12]</sup>. V SWABNA et.al (2018) studied about the palatal rugae pattern-a tool in gender determination <sup>[17]</sup>

### OBJECTIVES

- To develop the basic knowledge about the palatal rugae.
- To collect and record the information available.
- To study about the different types of patterns which can be observed in palatal rugae.
- To know about the characteristics and the difference observed in palatal rugae.
- To collect, organize and interpret data obtained about the palatal rugae and interpret data obtained.
- To compare, identify and examine the various palatal rugae patterns in both dentulous and edentulous population.
- When compared to various body sections, the morphological pattern can be helpful in forensic science in situations of mutilation.

## 3. METHODOLOGY

### Research design:

The palatal rugae is one of the most important and uncommon sources used in the forensic examination of the crime scene. It can be used to identify victims of mass disasters such as tsunamis, landslides, and volcano eruptions where the bodies are completely burned. It can also be used in situations where fingerprints are not available to identify the victim because each person's rugae pattern is unique. The current study compares and contrasts the palatal rugae between a completely edentulous population and a completely dentulous population. According to Thomas and Kotze's classification, palatal rugae meet

six criteria: they are convergent, divergent, curve, wavy, straight, and circular. It is intentional to research the study of palatal rugae by comparing the samples. The measurement of these rugae patterns was done using a digital vernier calliper on a total of 84 samples.

### Scope of study:

The study of physical evidence might benefit greatly from forensic analysis of comparison of palatal rugae since it can show that there might be a connection between a suspect and a crime scene or a suspect and a victim. The current study compares the patterns of the palatal rugae in complete dentulous and complete edentulous individuals. Every single person has distinctive and various palatal rugae patterns.

### Data collection Procedure:

There are a total of 84 images of dental casts that have palatal rugae and in which the rugae have been measured using a vernier calliper. The AJ Institute of Dental Sciences, the Manipal College of Dental Sciences, and the Srinivas Institute of Dental Sciences. According to the Thomas and Kotze classification and the Lysell classification, the palatal rugae pattern was given a name. Each rugae pattern was measured with a vernier calliper and described using the Lysell classification, which includes Primary, Secondary, and Fragmentary rugae. Each dental cast was captured on camera with a smartphone.

## 4. DATA ANALYSIS AND INTERPRETATION WITH RESULT

The Photographs of the palatal rugae was taken from the dental colleges such as Srinivas Institute of Dental Sciences, KMC Dental College and AJ institute of Dental Sciences. The total Number of samples collected were 84 samples in that 56 samples were dentulous and 28 samples were edentulous. The comparison of the samples were done by naming the palatal rugae patterns according to Thomas and Kotze classification, They are Diverge, Converge, Curve, Wave, Straight, Circular. The measurement of the palatal rugae pattern was taken with the help of digital vernier calliper and they were recorded according to the Lysell classification, They are Primary, Secondary and Fragmentary. For the measurement purpose, most prominent rugae pattern

was selected and measured. The names were noted down according to the measurement.

Table 4.10 - Number of rugae in Dentulous Population

Dentulous Population			
Patterns of Palatal rugae	Variants of Patterns	Right side (No. of Patterns)	Left side (No. of Patterns)
Diverge	Primary	22	19
	Secondary	1	0
	Tertiary	0	0

4.11 - Number of rugae in Dentulous Population

Dentulous Population			
Patterns of Palatal rugae	Variants of Pattern	Right side (No. of Patterns)	Left side (No. of Patterns)
Converge	Primary	14	12
	Secondary	0	1
	Tertiary	0	0

Table 4.12- Number of rugae in Dentulous Population

Dentulous Population			
Patterns of Palatal rugae	Variants of Patterns	Right side (No. of Patterns)	Left side (No. of Patterns)
Curve	Primary	21	23
	Secondary	8	5
	Tertiary	1	1

4.13- Number of rugae in Dentulous Population

Dentulous Population			
Patterns of Palatal rugae	Variants of Patterns	Right side (No. of Patterns)	Left side (No. of Patterns)
Wave	Primary	22	28
	Secondary	6	5
	Tertiary	0	0

Table 4.14- Number of rugae in Dentulous Population

Dentulous Population			
Patterns of Palatal rugae	Variants of Patterns	Right side (No. of Patterns)	Left side (No. of Patterns)
Straight	Primary	16	18
	Secondary	5	5
	Tertiary	0	0

4.15- Number of rugae in Dentulous Population

Dentulous Population			
Patterns of Palatal rugae	Variants of Patterns	Right side (No. of Patterns)	Left side (No. of Patterns)
Circular	Primary	2	2

	Secondary	0	0
	Tertiary	0	0

Table 4.16- Number of rugae in Edentulous Population

Edentulous Population			
Patterns of Palatal rugae	Variants of Patterns	Right side (No. of Patterns)	Left side (No. of Patterns)
Diverge	Primary	13	8
	Secondary	1	1
	Tertiary	0	0

4.17- Number of rugae in Edentulous Population

Edentulous Population			
Patterns of Palatal rugae	Variants of Patterns	Right side (No. of Patterns)	Left side (No. of Patterns)
Converge	Primary	0	2
	Secondary	0	0
	Tertiary	0	0

Table 4.18- Number of rugae in Edentulous Population

Edentulous Population			
Patterns of Palatal rugae	Variants of Patterns	Right side (No. of Patterns)	Left side (No. of Patterns)
Curve	Primary	17	17
	Secondary	3	5
	Tertiary	0	1

4.19- Number of rugae in Edentulous Population

Edentulous Population			
Patterns of Palatal rugae	Variants of Patterns	Right side (No. of Patterns)	Left side (No. of Patterns)
Wave	Primary	18	16
	Secondary	1	0
	Tertiary	0	0

Table 4.20- Number of rugae in Edentulous Population

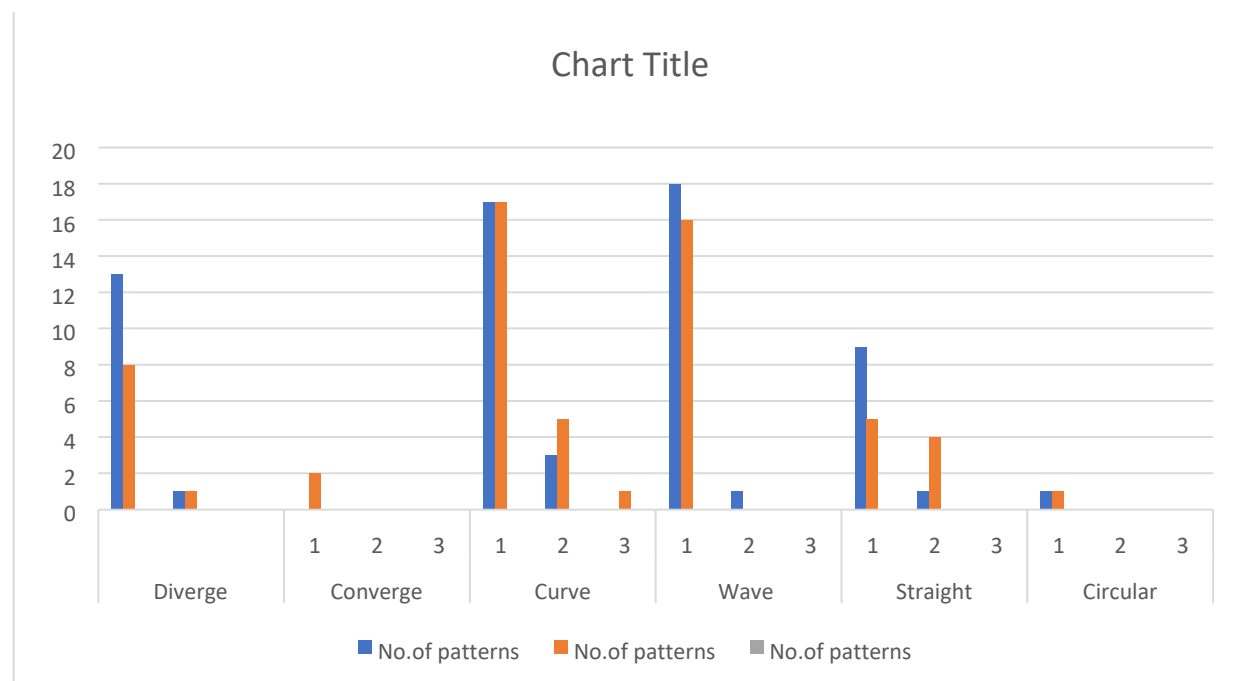
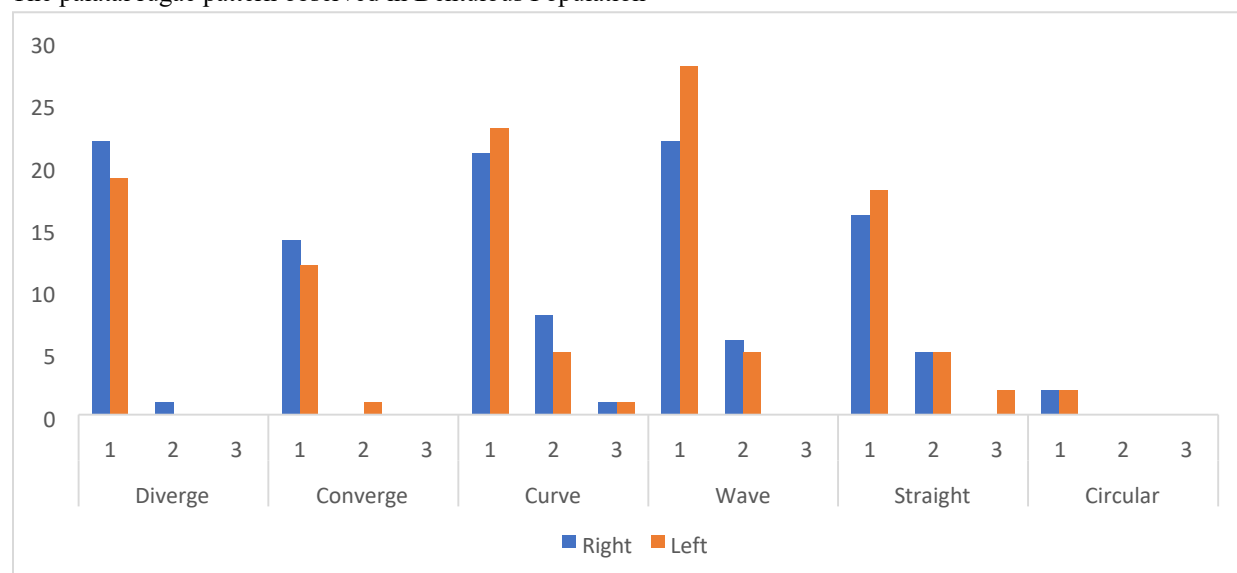
Edentulous Population			
Patterns of Palatal rugae	Variants of Patterns	Right side (No. of Patterns)	Left side (No. of Patterns)
Straight	Primary	9	5
	Secondary	1	4
	Tertiary	0	0

## 4.21- Number of rugae in Edentulous Population

Edentulous Population			
Patterns of Palatal rugae	Variants of Patterns	Right side (No. of Patterns)	Left side (No. of Patterns)
Circular	Primary	1	1
	Secondary	0	0
	Tertiary	0	0

## CHARTS

The palatal rugae pattern observed in Dentulous Population



The palatal rugae pattern observed in Edentulous Population

**Edentulous cast showing palatal rugae patterns**



**Divergent**  
**Straight**  
**Curve**

**Edentulous cast showing palatal rugae**



**Divergent**  
**Wave**  
**curve**

**Dentulous cast showing palatal rugae**



**Convergent**  
**Curve**  
**Straight**

**Dentulous cast showing palatal rugae**



**Divergent**  
**Straight**  
**Curve**

palatal rugae patterns of dental results in the interest of justice.

- [5] JAGDISH PRASAD RAJGURU et.al (2014) Comparative rugoscopic study of dentate and complete edentulous individuals in the south Indian population.
- [6] RANI S. THABITHA et.al (2015) evaluation of palatal rugae pattern in establishing identification and sex determination in Nalgonda children.
- [7] GARIMA BHATT et.al (2015) studied about the comparison of rugae pattern between dentulous and edentulous population of Rajasthan state.

## 5. CONCLUSION

Regardless of the length of edentulism or wearing of a denture, alterations in the pattern of the palatal rugae were seen with ageing. The occurrence and length of the alterations were decreased. Compared to dentulous subjects, edentulous subjects exhibited fewer complex characteristics are fewer in number, shorter in length. It has been shown that palatal rugae have a strong sense of individuality and consistency in form. It is commonly recognised that the palatal rugae pattern can be used to identify a person because it is unique to each individual human, much like the fingerprint. The palatal rugoscopy has distinct advantages over previous procedures. Research can be conducted by collecting more samples in different places, they are compared with more samples in the future research.

## BIBLIOGRAPHY

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