



ANALYSIS AND COMPARISON OF PALATAL RUGAE PATTERNS IN MALE AND FEMALE POPULATION GROUPS IN KOTA DISTRICT

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ABSTRACT

Introduction: Palatal rugae are irregular, asymmetric ridges of the mucous membrane extending laterally from the incisive papilla and the anterior part of the palatal raphae. The uniqueness and the overall stability of palatal rugae suggest their use for forensic identification. The pattern of orientation of the rugae remains unchanged throughout life. The shape, length, width, prominence, number and orientation of palatine rugae vary considerably among people. Once formed, they do not undergo any changes except in length, due to normal growth, remaining in the same position throughout an entire person's life. Not even diseases, chemical aggression or trauma seem to be able to change palatal rugae form.

Aim and objectives: Present study aims to analyze and compare the male and female palatal rugae patterns in terms of number and shape in people in Kota district, Kota, Rajasthan.

Materials and method: The study will be conducted in Department of Oral Pathology and Microbiology, Daswani Dental College and Research Centre, Kota (Rajasthan, India). Study group will consist of 50 healthy subjects (25 Male and 25 Female) in the age range of 17–40 years.

Results: Total number of rugae in both the sexes and between the two sides of the palate showed statistically significant difference. Primary rugae were predominant as compared with secondary rugae. Males had more number of rugae than females. Wavy pattern were found to be the most predominant type. In males wavy pattern was the most predominant type while in females, it was curvy rugae pattern.

Conclusion: A statistically significant association between the rugae shape and both sexes exists. This requires further extensive study for establishing its significance in personal and racial identification.

Keywords: Palatal rugae, male, female.



INTRODUCTION

Palatal rugae are irregular, asymmetric ridges of the mucous membrane extending laterally from the incisive papilla and the anterior part of the palatal raphae. The uniqueness and the overall stability of palatal rugae suggest their use for forensic identification.¹

Palatoscopy, or palatal rugoscopy is the name given to the study of palatal rugae in order to establish a person's identity. The palatal rugae are located on the anterior portion of the maxilla. Anatomically in hard mucosal palate, one can identify an antero-posterior thin central groove, bordered, on each side by crest: the palatal raphae. From this crest, literally, three to seven smaller crests emerge². Palatal rugae are formed in the 3rd month in utero from the hard connective tissue covering the bone.^[3]

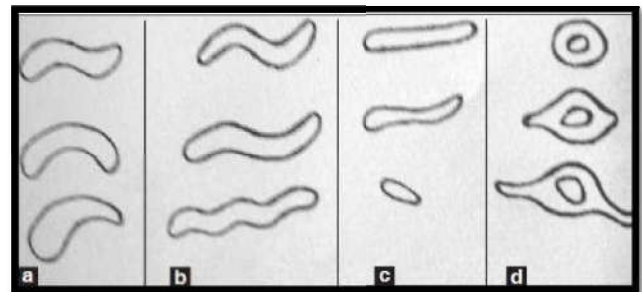
The pattern of orientation of the rugae remains unchanged throughout life. The number of rugae on each side of the palate varies between three and five. The palatine rugae do not extend posteriorly beyond the anterior half of the hard palate and never cross the midline. The anterior rugae usually are more prominent than the

posterior rugae [4]. The shape, length, width, prominence, number and orientation of palatine rugae vary considerably among people.

Once formed, they do not undergo any changes except in length, due to normal growth, remaining in the same position throughout an entire person's life. Not even diseases, chemical aggression or trauma seem to be able to change palatal rugae form. The ability of palatal rugae to resist decomposition changes for up to seven days after death was also noted. However, some events can contribute to changes in rugae pattern, including extreme finger sucking in infancy and persistent pressure due to orthodontic treatment [5].

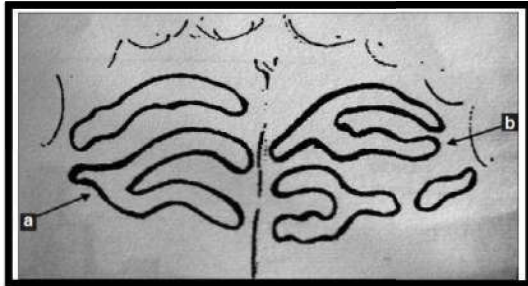
Classification of rugae based on shape

- a) curve
- b) wavy
- c) straight
- d) circular



Classification of rugae based on unification.

- a) Converging rugae
- b) Diverging rugae



Individual identification is a challenging task in forensic odontology. Circumstances where identification of an individual by fingerprint or dental record comparison is difficult, palatal rugae may be considered as an effective alternative source. Palatal rugae have been shown to be highly individualistic and unique and it maintains consistency in shape throughout life [6]. In forensic dentistry, palatal rugae patterns can lead us to important information and help in persons identification. Analysis of palatal rugae pattern combined with other methods is an important alternative and complementary technique for human identification, providing a significant contribution in cases of criminal investigation.

Rugoscopy is rather simple technique not requiring any complex instrumentation. Palatoscopy has been successfully used in necro identification. Thus palatal rugae hold potential as a supplementary tool, along with the dentition to establish the identity of an Individual.⁶

The palatal rugae pattern can act as a fingerprint in identification of a person. The uniqueness of rugae to each individual has already been accepted as a possible aid to personal identification.⁷

AIM AND OBJECTIVES

Our study aimed to examine and compare the male and female rugae patterns in terms of number and shape in people in Kota district, Kota.

MATERIALS AND METHOD

The study was conducted in Department of Oral Pathology and Microbiology, Daswani Dental College and Research Centre, Kota (Rajasthan, India). Study group consisted of 50 healthy subjects (25 Male and 25 Female) in the age range of 17–40years.

The study was conducted after obtaining Institutional ethical committee clearance and written informed consent from each subject after briefing them about



the procedure. Maxillary arch impression of was taken using alginate and the cast was poured immediately with Type 3 dental stone. The casts were free of voids or air bubbles. Each cast was numbered for easy identification. Palatal rugae patterns on the cast were highlighted using sharp black graphite pencil under well illuminated area and magnifying glass. They were then analyzed following the classification given by Thomas and Kotze.

Number of palatal rugae on the right and left side of the mid palatine raphe were counted. Length of each ruga was recorded by holding a pointed divider with adjustable screw from the starting point at the mid palatine raphe to the end of the rugae laterally and then measured on the scale. For circular shape ruga, maximum diameter was considered as its length. Rugae were then analyzed on the basis of primary rugae, direction, unification and pattern. All data thus obtained were recorded in a proforma.

RESULTS

Female sample: 1 - 25

Male sample: 26 - 50

Observation table

Table 1

Distribution of rugae numbers among 50 peoples in Malappuram

Sample No.	Right	Left	Sex
1	3	4	F
2	3	4	F
3	3	3	F
4	5	4	F
5	5	4	F
6	2	4	F
7	3	5	F
8	4	5	F
9	6	5	F
10	5	4	F
11	4	5	F
12	5	7	F
13	3	5	F
14	4	3	F
15	5	5	F
16	3	6	F
17	4	5	F
18	5	4	F
19	4	3	F
20	7	5	F
21	3	3	F
22	3	4	F
23	3	3	F
24	3	3	F
25	4	4	F
26	4	3	M
27	5	6	M
28	3	6	M
29	3	6	M
30	4	5	M
31	5	5	M
32	4	5	M
33	5	5	M
34	3	6	M
35	3	4	M
36	5	4	M
37	3	4	M
38	5	4	M
39	4	4	M
40	4	4	M
41	3	5	M
42	5	5	M
43	4	5	M
44	6	3	M
45	5	3	M
46	4	6	M
47	4	7	M
48	4	6	M
49	5	5	M
50	6	3	M



Table 2
Distribution of rugae length (primary and secondary rugae)

GROUP	SAMPLE NO.
Primary rugae	1, 4,5,6,7,9,11,12,13,15, 17,20,21,22,23,25,26,27
	8,30,32,33,34,36,37,39
	41,43,44,46,47,48
Secondary rugae	2,38,10,14,16,18,19,24,29,31,35, 38,40,42,45,49, 50

Table 3
Distribution of total numbers of different rugae shapes

Group	Sample	Total Number
Straight	10,19,20,21,22,32,37, 39,41,44,46	11
Wavy	2,3,4,6,8,11,14,23,26, 27,28,30,34,35,36,40 42,45,47,48,49,50	22
Curved	1,5,7,9,12,13,16,,18 24,29,31,32,33,43	14
Circular	17,25,50	3
Unification	1,3,6,7,8,9,11,13,14 17,21,23,25,26,27,29 30,32,35,37,38,39,42,44,47,50	26

Total number of rugae in both the populations and between the two sides of the palate showed statistically significant difference. On observing the length, primary rugae were predominant as

compared with secondary rugae Number of rugae in males was greater than that found in females. Wavy pattern were found to be the most predominant type.

Unification convergent and divergent types were found in relatively lesser number.

In males, wavy pattern was the most predominant type while in females, it was curvy rugae pattern. However, differences between males and females for curvy, wavy, and straight rugae pattern were found to be statistically insignificant Females had significantly higher proportion of unification convergent type of rugae as compared to males. On the other hand, males had significantly higher number of unification divergent type of rugae in comparison to females.

DISCUSSION

Individual identification is a challenging task in forensic odontology. Circumstances where identification of an individual by fingerprint or dental record comparison is difficult, palatal rugae may be considered as an effective alternative source. Palatal rugae have been shown to be highly individualistic and unique and it maintains consistency in shape throughout life. In forensic dentistry,



palatal rugae patterns can lead us to important information and help in persons identification. Analysis of palatal rugae pattern combined with other methods is an important alternative and complementary technique for human identification, providing a significant contribution in cases of criminal investigation.

Rugoscopy is a simple, reliable, inexpensive, less time consuming technique not needing much complex instrumentation.

Literature search showed numerous studies on palatal rugae pattern conducted in India with variable results.

Oberoi IS et al⁸, Khajuria et al⁹, Dwivedi et al¹⁰ in their study found mean primary rugae were significantly more in males than females. Similar results were noted in our study. However Asdulah et al¹¹ found more number of rugae in females than in males. In our study males had predominant wavy pattern and females curvy pattern. This result is contrary to that of Khajuria et al⁹ who reported straight type rugae to be most prevalent in both sexes. Asdulah et al¹¹ reported straight and curved forms to be significantly more in number in females than in males. . Such a variation could be

the result of geographical and ethnic variation.

CONCLUSION

The uniqueness of rugae pattern in an individual is promising. A statistically significant association between the rugae shape and both sexes exists. Literature search showed numerous studies on palatal rugae pattern conducted in India with variable results. Such a variation could be the result of geographical and ethnic variation. Hence further extensive studies are required for establishing the significance of palatal rugae pattern in personal and racial identification.

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