

COMPARISON OF RUGAE PATTERN BETWEEN DENTULOUS MALES AND FEMALES AMONG CHENNAI POPULATION

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ABSTRACT: AIM AND OBJECTIVE: To compare the palatal rugae pattern between dentulous males and females of different age groups among the Chennai population. The individuality of a palatal rugae as an aid for personal identification was an objective of this study.

BACKGROUND: Palatal rugae are asymmetrical irregular elevations of dense connective tissues located on the anterior third of the palate extending on either side of the mid palatine raphae, behind the incisive papilla. The uniqueness of the palatal rugae suggest their important role in personal identification.

METHODOLOGY: The study group was equally divided between the sexes, 50 males and 50 females. The primary impressions were made using an irreversible hydrocolloid alginate impression material in a perforated tray. The impression is washed under tap water and the study cast was prepared with dental stone (Type 3 gypsum products). From the primary cast, number, shape and length of the Palatal rugae were analysed.

RESULT: From this study, males are having higher number of rugae than females. 64.6% of the females are having the rugae size in the range between 5-10 mm whereas only 62.1% are having the rugae within that range. According to shape of the rugae, 46.1% of females are having wavy rugae and 47.5% of males are having curvy rugae. However chi-square test observed no statistical differences between males and females with respect to length and shape of the rugae.

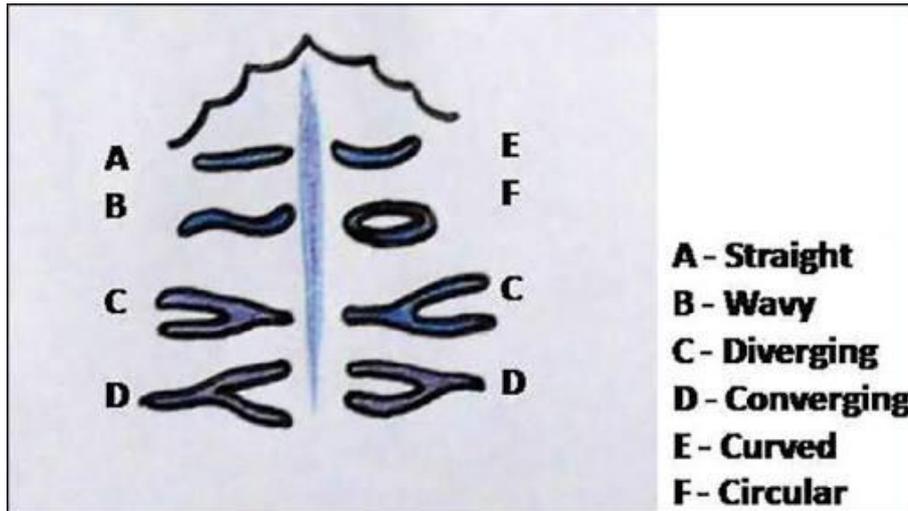
CONCLUSION: Palatal rugae is unique in each individual which is one of the features that aids as a personal identification in forensic dentistry.

INTRODUCTION: Palatal rugae or rugae palatine or plicae palatinae transversae are asymmetrical irregular ridges of dense connective tissues located on the anterior part of the hard palate on either sides of the mid palatine raphae, behind the incisive papilla. The pattern of orientation is formed by the 12th to 14th week of prenatal life⁽¹⁾. It remains stable and consistent in number and does not undergo any change due to growth, ageing or disease. Palatal rugae area is well protected from trauma due to its position which is surrounded by cheek, lips and buccal pad of fat.

Palatal rugoscopy (the study of the shape of palatine rugae) have an important role in the forensic science, prosthodontics, orthodontics and also in genetics and anthropology⁽²⁾. In forensic science, because of its unique feature it could be used in circumstances in which it is difficult to identify a dead person according to fingerprints or dental records. Catastrophic accidents involving plane crashes, fires and explosions can destroy the fingerprints, but interestingly palatal rugae patterns are preserved⁽³⁾.

Palatal rugae are considered as a secondary bearing area in maxilla. In prosthodontics, it can be used as a landmark for artificial canine position in the arrangement of teeth. In orthodontics, studies have reported the importance of palatal rugae as a stable unique reference landmark for longitudinal cast analysis and measuring tooth movement⁽⁴⁾. This study deals with the differences in rugae pattern between dentulous males and females which involves number, shape and length.

VARIOUS SHAPES OF RUGAE:

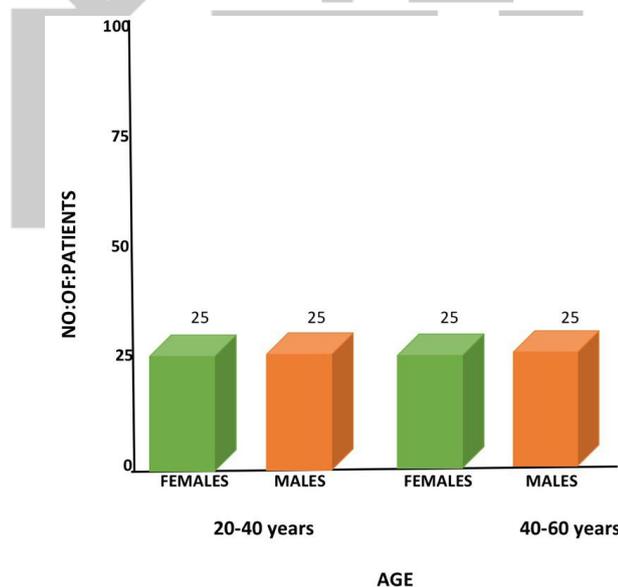


MATERIALS AND METHOD: Hundreddentulous out patients from Saveetha dental college and hospitals were included in this study. The study group was equally divided between the sexes, 50 males and 50 females. The primary impressions were made using an irreversible hydrocolloid alginate impression material in a perforated tray. The impression is washed under tap water and the study cast was prepared with dental stone (Type 3 gypsum products). From the primary cast, number, shape and length of the Palatal rugae were analysed.

Inclusion criteria: Young healthy subjects with bilateral class 1 occlusion.

Exclusion criteria: Previous surgery, craniofacial trauma and any orthodontic treatment.

RESULT: In this study, totally 100 subjects were taken for palatal rugoscopy. It involves the study of comparison of rugae number, length and shapes between males and females and the results are shown below,



GRAPH-1: NO. OF: FEMALES AND MALES BASED ON THE AGE

AGE GROUP	AGE(years)	TOTAL NO: OF: INDIVIDUALS	TOTAL : NO: RUGAE	MEAN
I	20-40	50	394	8.0
II	40-60	50	366	7.3

TABLE-1: NO: OF RUGAE IN DIFFERENT AGE GROUPS OF INDIVIDUALS

SEX	NUMBER	TOTAL NO:OF: RUGAE	MEAN±SD
FEMALE	50	356	7.12±1.05
MALE	50	404	8.08±1.10

TABLE-2: Total no: of subjects and the statistical comparison of the rugae in males and Females.

Results						
	Female	Male				Row Totals
<5mm	102 (105.39) [0.11]	123 (119.61) [0.10]				225
5-10mm	230 (225.31) [0.10]	251 (255.69) [0.09]				481
>10mm	24 (25.29) [0.07]	30 (28.71) [0.06]				54
Column Totals	356	404				760 (Grand Total)

The chi -square statistic is 0.514. The p-Value is 0.773377 which is not significant.

From the TABLE-2: Males are having higher number of rugae 404 with Mean±SD(8.08±1.10) than females 356 with Mean±SD (7.12±1.05).

From the TABLE-3, 28.6% of females's rugae are <5mm in length, 64.6% are 5-10mm in length and only 6.7% are >10 mm in length. Meanwhile 30.4% of male's rugae are <5mm in length, 62.1% are 5-10mm in length and 7.4% are >10mm in length. From the result, maximum rugae of males are in <5mm, 5-10mm and >10mm in length than females whereas females.

S:NO	SIZE OF RUGAE	FEMALES		MALES	
		No:of rugae	%	No:of rugae	%
1.	<5mm (fragmented)	102	28.6	123	30.4
2.	5-10mm	230	64.6	251	62.1
3.	>10 mm	24	6.7	30	7.4
TOTAL :		356	100	404	100

TABLE-3:Comparison of the size (length in mm)of the rugae in males and females.

S:NO	RUGAE SHAPES	FEMALES		MALES	
		No:of rugae	%	No:of rugae	%
1.	Curve	138	38.7	192	47.5
2.	Wave	164	46.1	138	34.1
3.	Straight	34	9.5	58	14.3
4.	Diverging	20	5.6	16	3.9
TOTAL :		356	100	404	100

TABLE-4:Comparison of the shapes (length in mm)of the rugae in males and females based on kapali's classification.

From the TABLE-4, Females rugae are 38.7% curved,46.1% wavy,9.5% straight and 5.6% diverging.Males rugae are 47.5% curved,34.1% wavy,14.3% straight and 3.9% diverging.From the result, males are having more curved, straight and diverging rugae than females whereas females are having higher number of wavy rugae than males.

DISCUSSION:The palatal rugae are considered to be unique for an individual and remains unchanged during an entire lifetime.The analysis of human palatal rugae has been suggested as an alternative method for identification 1889 by Allen³⁴ (1889). English et al.³⁵ (1988)⁽⁵⁾.



PHOTOGRAPH SHOWING THE PALATAL RUGAE PATTERN IN FEMALE

PHOTOGRAPH SHOWING THE PALATAL RUGAE PATTERN IN MALE

Several studies done in the past have revealed and have statistically proved that the rugae patterns are highly individualistic and there are differences between races and gender(9)(10)(11).

Most studies use classification proposed by Lysell, Thomas and Kotze(7). This study is conducted based on Kapali's classification. Other study determine the differences in the palatal rugae pattern (number, length, shape, direction, and unification) among male, female, and transgender population(7). This study determines the differences in palatal rugae pattern (number, length and shape) between males and females.

From the result, it was proven that males are having higher number of rugae than females. Previous studies⁽⁵⁾⁽⁶⁾ have also given the same result. This study shows that both males and females are having their maximum number of rugae in the length of 5-10 mm. Mostly all the other studies show the same result.

This study shows that males are having more curved, straight and diverging rugae than females. Other study found the mean number of wavy rugae to be more among males compared to females(8). In our study, it was proven that females are having higher number of wavy rugae than males which is differing from other studies. Previous study shows the same result as males are having more curved, straight and diverging rugae than females⁽⁵⁾ but another study shows that females are having more straight rugae than males⁽⁶⁾.

CONCLUSION: Palatal rugae plays an important role in dental forensic practice. Various studies have also shown an importance of palatal rugae in the forensic science, prosthodontics, orthodontics and also in genetics and anthropology⁽²⁾.

Forensic identification of palatal rugae depends largely on the availability of antemortem records. Antemortem records of palatal rugae patterns can be obtained in dental practice in various forms (dental casts, intraoral photographs and dental prosthesis). So, it is the responsibility of each dentist to maintain dental records of their patients for the purpose of identification.

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