

Palatal Rugae: In Forensic Examination

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Abstract

The pattern and number of rugae in north Indian population and its change with ages was studied. Two hundred three (M: F 102:101, age between 18-26 years) dental casts were studied. There was significant increase in length of rugae found with age. Straight type rugae are common in north Indian population. This study will help in identifications of north Indian population.

Keywords: *Palatal rugae, forensic odontology, pattern, type.*

Introduction

Palatal rugae types analysis has been employed successfully in human identification. It is refer to ridges on the anterior part of the palatal mucosa, each side of the median and behind incisive papilla. It has been suggested that mean rugae count changes moderately in adolescence, then increases markedly from the age of 30 to 40 years.¹ In previous studies it has been suggested that the characteristic patter of the palatal rugae did not change as a result of growth, remaining constant from time of development until the oral mucosa degenerated at death.² The purpose of this study to importance of palatal rugae and pattern in north India for identification in forensic odontology.

Material and Methods

Two hundred three (M: F 102:101 age between 18-26 years) dental casts from Department of Orthodontics, Government Dental College, PGIMS, Rohtak, (Haryana) were examined.

The dental casts with less clarity and air bubble in palatal rugae area were excluded. The classification used to describe the rugae patterns was based on those described by Lysell and Thomas and Kotze^{3,4}. Rugae length was recorded under magnification with a slide caliper to an accuracy of 0.02 mm.

The rugae are categorized as following

Primary rugae (A-4 to 9 mm, B-9 mm or more than 9 mm)

Secondary rugae: 2-5 mm.

Accessory rugae: less than 2 mm.

The shapes of individual rugae are classified into six major types : w-shape, curved, straight, wavy, circular and star shape.

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The data were analysis by SPSS (version 11.0) and 't' test was applied.

Results

The results of the study are depicted in the tables below

Table 1: Change in length of rugae with age in north Indian (right side and left side) in mm (mean + SD)

Age	Sex	Right side Mean + SD (in mm)	Left side Mean + SD (in mm)
18-20	M	9.6 ± 2.4	9.7 ± 2.3
	F	9.4 ± 2.3	9.4 ± 2.4
20.1-22	M	9.8 ± 2.5 ^a	9.8 ± 2.4 ^e
	F	9.7 ± 2.4 ^b	9.8 ± 2.5 ^f
22.1-24	M	10.3 ± 2.4 ^c	10.4 ± 2.5 ^g
	F	10.1 ± 2.3 ^d	10.1 ± 2.3 ^h
24.1-26	M	10.4 ± 2.4	10.4 ± 2.5
	F	10.2 ± 2.3	10.2 ± 2.4

a,b,c,d,e,f,g,h p<0.05 (Significantly increase with age).

Table II: Average number of palatal rugae in north Indian population

Age	Sex	Right side	Left side	Mean
18-20	M	4.9	4.8	4.85
	F	4.9	4.9	4.9
20.1-22	M	4.9	4.9	4.9
	F	4.9	5.0	4.95
22.1-24	M	5.0	5.0	5.0
	F	5.0	5.0	5.0
24.1-26	M	4.9	4.9	4.9
	F	4.9	4.8	4.85

Significant increase was observed in length of rugae in both sides between 20.1 to 24 years in both genders (Table I, $p<0.05$). Average numbers of palatal rugae increases with age up-to 24 years and decrease thereafter (Table II). Straight type rugae are more commonly found while circular were least common (Table III).

Discussion

The finding that total number of rugae changes with ages (Table I, $p<0.05$) is not in consonance with previous studies.^{3,5} The average number of palatal rugae increase with age up-to 24 years, and decreases thereafter (Table II). While previous study noted that the characteristic pattern of the palatal rugae did not change as a result growth, remaining stable from time of development until the oral mucosa degenerated at death.⁶ No significant difference in number of rugae and length of rugae between the sex (Table I, II). It has been observed that straight type rugae most commonly while circular least in both genders (Table III).

Some factors can contribute to changes in rugae pattern, including trauma, extreme finger sucking in infancy, and persistent pressure with orthodontic treatment and dentures.³ Few studies using palatal rugae as a method of forensic identification has been found in the literature. The idea of rugae being unique to an individual but not having exact measurements is a challenging concept. Though, enough evidence is lacking to allow palatal rugae to be used as a sole means of dental identification, a protocol can be developed utilizing digital photographs and dental casts of palatal rugae as one of the criteria for identification.

Table III: Distribution (in %) types of rugae

Type of rugae	Sex	Distribution (in %)
W-shaped	M	12
	F	11
Curved	M	14
	F	13
Straight	M	31
	F	20
Wavy	M	22
	F	35
Circular	M	8
	F	10
Star	M	11
	F	11

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