

Identification and Comparison of Rugae pattern in Complete Edentulous Patients

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Abstract:

Objectives: The aim of this study was to identify and compare the rugae pattern in Latur males and females, which may be additional method of identification in cases of crimes or aircraft accident alginate impression of palate of selected 60 patients, 30 males and 30 females were poured in stones. The cast were of voids and air bubble. The method of rugae pattern followed was that of Thomas (1983) which includes the number shape and unification of rugae. The magnified lens was used for identification and plastic ruler used for mesurement. All measurent were in mm and were done by one examiner. The study revel that there was no significant difference in the total no or the length of rugae between the two sexes. The different type rugae between the male and female were statically compared. The female showed significant difference in the converge type while the male have significant difference in the circular type. It may be concluded that the rugae pattern can be additional method of differentiation between the male and female in conjugation with the other method such as visual, fingerprint and dental characticisc in the forensic science.

Key words: Edentulous ridge, Rugae pattern.

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Introduction:

According to glossary of prosthodontics, rugae re anatomical folds or wrinkles (usually used in the plural sense) the irregular fibrous connective tissue located on the anterior third of palate behind the incisive papilla. They are also called plica palatinae.¹ The rugae pattern have been studied for various purposes mainly in the field of anthropology, comparative anatomy, genetics, prosthodontics and orthodontics.^{2,3} in the forensic medicine, three main method of identification were used namely the visual , A fingerprint, and dental characteristic. In many instances one or all of these methods mat not be totally effective or coclusive.⁴ many criminal investigation and victim of aircraft .^{5,6} Accident

have been identified but their dentition. ^{7,8} the use of human palatal rugae⁹ was suggested as an alternative method of identification.¹⁰, rugae are protected from trauma by their internal position in the head and they are insulated from heat by the tongue and buccal pad of fat . In one study it was reported that no two palates are alike in the configuration and that the palatal print did not change. Even between twins, the studies indicated that the patterns are similar but not identical. ¹¹ the purpose of these study paper was two studies the rugae pattern in Latur male and female sample and two compare the pattern between the two group which may be an

additional method of identification in cases of crimes or aircraft accidents.

Materials and Method:

The total no of 60 complete edentulous subjects, 30 males and 30 females were selected from MIDSAR Dental College Latur all subject were healthy individuals free of congenital abnormalities, inflammation, and trauma.

The Impression

An irreversible hydrocolloid was used as an impression material of an appropriate edentulous metal tray for the upper dental arch for all subjects. All instruction by the manufacturer was followed such as water/powder ratio, vacuum mixing, and the use of vibrator. The impressions were then poured into stone. All casts were free of air bubbles or voids especially at the anterior third of the palate.

Method of identification

The method of rugae identification was based on classification of Thomas et al 1983. This classification includes number, length, shape and unification of rugae. The shapes are classified into curved, wavy, straight and circular. Fragmented rugae are those which have length less than 5mm. Unification is divided into converge where two rugae originate away from the centre and unite towards it. While diverge ones are those rugae which originate from the centre and diverge away from it (Table No. 1)

Sex	Total numbers	Total number of Rugae	Mean	SD
Male	30	219	7.3	0.51
Female	30	216	7.2	0.46

Table 1. Total number of subject and mean value of rugae in male and female.

The rugae were highlighted by black pen on the cast and magnification lens was used for identification. Measurement was done using a plastic ruler in millimetre (Kenson). All the identification and measurements were done by one examiner and readings were repeated three times for each cast. In this study, the fragment type of rugae of a size less than 5mm were ignored, when the mean value of total number of rugae was calculated. The fragment types were studied separately for a comparative study purpose between male and female.

Statistical Analysis

Two sample t-test and chi square test were used for comparison of means and relationship between the attributes. A significance level of 5% was considered as critical value.

Result:

The total number of rugae and the mean value for male and female is illustrated in table one. The distribution of different type of rugae as well as the descriptive statistics is shown in table 2.

Pattern	Sex	N	Mean	SD	P-VALUE
Converge pattern	M	30	8.6	12.4	0.036
	F	30	16.1	14.4	
Divergent pattern	M	30	1.8	5.8	0.612
	F	30	1.2	4.3	
Curved pattern	M	30	26.1	13.2	0.507
	F	30	24.0	15.3	
Wavy pattern	M	30	45.4	13.8	0.635
	F	30	43.7	18.5	
Straight pattern	M	30	12	11.6	0.427
	F	30	14.1	12.0	
Circular pattern	M	30	5.8	10.1	0.02
	F	30	1.7	4.6	

TABLE 2. Descriptive statistics of % of different type of rugae categorized by gender

There was significant difference in the converge type of rugae which was found to be higher

among females than male ($p=0.034$). There was also significant difference in circular type which was higher in males than females ($p=0.02$). The no and difference in the length of rugae are shown in the table 3 and 4. The chi-square and t-test showed no significant difference between the two sexes.

Sex	Fragmented less than 5 mm(%)	From 5 to 10mm (%)	More than 10 mm(%)	Total
Male	56(11.3)	225(45.6)	213(43.1)	494
Female	63(12.7)	212(42.8)	220(44.5)	495

TABLE 3. Distribution of length of rugae in the male and female

Type of rugae	Sex	Mean	SD	P-value
Fragmented	M	1.37	1.09	0.442
	F	1.58	1.34	
From 5-10 mm	M	3.76	1.02	0.116
	F	3.35	1.27	
More than 10mm	M	3.54	1.05	0.29
	F	3.83	1.20	

TABLE 4. Descriptive statistics of difference in the rugae length in mm between the male and females.

Discussion:

The method used in these study(Thomas et al, 1983) 13 was found to be the most practical and easiest to apply compared with other methods such as those of Houser et al 14 and of Reuer . 15 many study have been carried out on the rugae pattern in Black, Caucasian, and mixed population in South Africa. 12 and in the Japanese. 17, 18 however, no single study has been done among Indian races. This study did not show any significant difference in the number of rugae between male and females. The results do not conform to the results presented by Dohke

and Osato. 18 who indicated that among the Japanese, the females had fewer rugae than male this finding may indicate that there is racial and such difference. However a significant difference was found to be in a two shapes of rugae in the present study. The first is that the converge type was found to be higher in female than male. This difference was found to be statistically significant. The other findings was that the presence of the circular type which was found to be statistically higher in males than females .Those two differences could be factor for identification together with other method of identification. Further research may be indicated with a large sample , size, in order to substantiate the findings of the present study in addition the examining the rugae pattern in other Arab nationalities may further corroborate our findings

Conclusion:

1. There was no significant difference in total number of rugae between male and female.
2. Significant differences were found in two shapes, the converge type which was found to be higher in female and the circular type to be higher in males.
3. The rugae pattern may be useful additional method for post mortam identification.

References:

1. The Academy of Prosthodontics. The Glossary of Prosthodontics Terms. 7 th CV, osby, 1999.
2. Lyseell L. Plicae palatinae transverse and papillaincisiva in man. A morphologic and genetic study. Acta Odontol Scand 1955; 3; supp. 18.
3. Almeida MA, Philips C, Kula K, and Tulloch C. Stability of the palatal rugae as landmark for analysis of dental cast. Angle Orthod 1955; 65:43-48.

4. Morlange WM. Forensic Dentistry Aviation. Space and Environmental Medicine 1982; 53 (1): 27-34.
5. Barsely RE, C ottone FA and Cuminata FA. Identification via dental remains, Pan Americanflight 759. J Forensic Sci 1985;30 (1) : 128-136
6. Solheim T and Van den Bos A. International disasteridentification Report .Am J Forensic Med Pathol 1982;3(1) :49-52
7. Gillespie TH, Brannon RB, Gardner FD and Grason FW. Dental identification of remains from 23 october 1983, Bombing U.S. Marine Headquarters, Beirut, L ebanon. J Military Med 1985;150(12):635-639
8. Boston RF. Dental identification of the Victorian bashfire victims. Austr Dent J 1984; 29(2):343-346.
9. Allan H. The palatal rugae in man. Dental Cosmos 1989;31(64)66-80.
10. Sassouni V. Palatal print, physoprint and roentoenographic cephalometry as new method in human identification (preliminary report). J ForensicSci 1957; 2:420-442.
11. Ritter R. Uber dies from den verlauf und die. Yypeneinteilung der gaumenleisten Zeitschrift fur morphologic and anthropology. 1943; 40; 367.
12. Thomas CJ and Kotze TFW. T he palatal rugae pattern in Southern African human population. Part 1. A description of the population and method for investigation. J Dent Assoc South Afr 1983; 38:547-553.
13. Thomas CF and Kotze TFW. The palatal rugae pattern: A new classification. J Dent Assoc S Afr. 1983;38:153-157
14. Houser A, Daptonte A and Roberts TS. Palatal rugae. J Anat 1989; 165:237-249.
15. Reuer E. Gaumentleistein and Gaumerferm bei drei lakalen population in Osterreich. Mitteilungrn der Anthropologischen G ESELLSCHAFT IN Wein 1973; 103:1-3.
16. Husser E. Zur Bedeutung Veranderung der Gaumenflaten Menschen Stoma, 1951:4-3.
17. Manihara K, Masuda T and Tanaka T. Affinities of denta. Characteristics in the Okinawa Islander. J Anthropological Society of Nippon 1973; 82:75-81.
18. Dohke and Osato S. Morphological study of the palatal rugae in Japanes 1. Bilateral difference in ths regressive evalution of the palatasl rugae. Jap JOral Biol 1994;36:125-140s