Value of Palatine Rugae in Forensic Identification of a Population Sample from Upper Egypt

Afaf M. A. Farghaly1; Mohammad I. Ahmed2; Raafat A. Tammam3; Ghada A. Omran1

1 Forensic Medicine and Clinical Toxicology department, Faculty of medicine, Assiut University, Assiut, Egypt
2 Forensic Medicine and Clinical toxicology department, Faculty of medicine, Al Azhar  University, Assiut branch, Egypt
3 Fixed Prosthodontics, Faculty of Dentistry Medicine, Assiut University, Assiut, Egypt

Abstract
Palatal rugae may be an alternative identification mode when it is difficult to utilize finger prints or dental records. The present study was undertaken to estimate palatine rugae biometric characteristics of a population sample from Upper Egypt; and to compare age and gender effects on rugae pattern. The study sample comprised 100 dental casts of volunteers or patients attending Al-Azhar Dental Hospital (Assiut branch), 25 males and 25 females with age range 20-30 years (group I) and another set with age range 40-50 years (group II). Trobo’s classification was implemented. Results revealed that sinuous rugae shape was the most prevalent in the total sample and the least was the circle type. Although most of shapes are insignificantly differentiated in both genders, males had significantly higher proportion of angle and point pattern as compared to females. Palatine rugae shape was also differentiated on each side of the palate in males and females. The total sample showed most of rugas in the E quadrant, then D quadrant from posterior to anterior part of the palate. However, younger age group had significantly higher numbers in the E quadrant as compared with elder group, who had considerable higher proportion in the C and B quadrants. Additionally, rugae shape could not differentiate between age groups as well as rugae position in both genders. Moreover, rugae length and number did not differ in relation to gender or age. It can be concluded that palatine rugae could play a significant role in forensic identification and population differentiation.

Introduction
Palatine rugae are asymmetrical and irregular elevations of the mucosa located in the anterior third of the palate, made from the lateral membrane of the incisive papillae and arranged in transverse direction from palatine raphe located in the mid-sagittal plane. The pattern of orientation is formed by the 12th to 14th week of prenatal life and remains stable until the oral mucosa degenerates after death (Thomas et al, 1987). Palatine rugae may be an alternative mode of identification when traffic accidents, acts of terrorism or mass disaster occur in which it is difficult to identify a person according to finger prints or dental records. (Patil et al., 2008). Previous studies that considered the use of palatine rugae pattern in personal identification or gender differentiation are limited (Gondivkar et al, 2011).

Aims
The present study was carried out to:
1- estimate the prevalence and biometric characteristics of palatinal rugae patterns in a population sample from Upper Egypt,
2- know the different morphological rugae patterns in males and females for gender differentiation.
3- compare age effects on rugae patterns

Subjects & Methods
Cross sectional study design using a random sampling technique was employed in this study. The sample comprised of 100 dental casts from 100 subjects who were volunteers or patients attending Al-Azhar Dental Hospital, 25 males and 25 females (age range 20-30 years) and another 25 males and 25 females (age range 40-50 years). Classification of Trobo has been used in this study which divides simple rugae shapes into 6 groups; classified from A to F and connected with the letter X, that result from two or more simple rugae union (Pueyo et al., 1994). Size, number and position of rugae were also investigated in relation to age and gender.

Results
Rugae shape could not discriminate between age groups and rugae position could not differentiate both genders. Moreover, rugae length and number did not differ in relation to gender or age in the investigated population sample.

Conclusion
Studying the palatinal rugae pattern in an Upper Egyptian population sample revealed that rugae shape aided gender differentiation as males has significantly higher angle & point rugae patterns than females. Moreover, males had sinus rugae more in left side of the palate & line rugae more in right side, while females had sinus rugae more in the right side & curve rugae more in the left side. The total sample showed most of rugae were in the E quadrant, then D quadrant from posterior to anterior part of the palate. However, younger age group had significantly higher numbers in the E quadrant as compared with the elder group, who had considerable higher proportion in the C and B quadrants. Additionally, rugae shape could not discriminate between age groups as well as rugae position in both genders. Moreover, rugae length and number did not differ in relation to gender or age. It can be concluded that palatine rugae pattern is consistent throughout life and can be population specific.

References