

Analysis of Palatal Rugae Patterns in Rural Population of Greater Noida

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Abstract

Forensic odontology is the branch of forensics that deals with human identification based on dental features. This study was designed to identify the patterns of palatal rugae in the rural population in the district of Greater Noida. A total of 100 subjects (50 males and 50 females) aged between 18-30 years were enrolled in the study. Analysis of the rugae patterns (calcorrugoscopy) was done according to Nayak et al. and concluded that the maximum number of rugae patterns found were of wavy in nature followed by curve patterns.

Key words : Forensic Odontology; Palatal Rugae; Calcorrugoscopy.

Introduction

The first person to describe palatal rugae was Winslow in the year 1932, and they are referred as asymmetrical, irregular ridges on the anterior part of palatal mucosa on each side of the median palatine raphae and behind the incisive papillae[1-3]. The rugae play an important part. In forensic odontology as they are permanent and unique to each individual which enables the forensic odontologist to establish identity of the deceased through casts, tracings or digitized rugae pattern[4] as once formed, they do not undergo any changes except in length which is attributed to overall growth of an individual[3-5]. The study of palatal rugae is termed as "rugoscopy"[6].

There are various advantages of studying the rugae patterns in individuals, which are that the rugae remain unchanged and do not change upon action by chemicals, heat, diseases, or trauma. The anatomical position of rugae which are placed inside the palatal rugae are also surrounded by the cheeks,

lips, tongue, buccal pad of fat, teeth and bone, which keeps them well protected from trauma and high temperature. It is interesting to note that their form, layout, and characteristics are not altered by either tooth eruption or edentulism. It is a boon for forensic researchers as they are stable and resist decomposition for up to 7 days after death, making it easier to identify people, especially in cases of mass disasters[3,7-10].

Such is the importance on palatal rugae that this study aimed to identify the patterns of palatal rugae in the rural population in the district of Greater Noida, India and provide necessary correlations with respect to sex of the individual.

Materials and Methods

After obtaining ethical clearance from the ethical review board, a total of 100 subjects (50 males and 50 females) aged between 18-30 years were enrolled in the study after obtaining a written consent. Subjects unwilling to be a part of the study, or having a cleft palate, surgery or extractions in the maxillary region were excluded.

Following alginate impressions of all the maxillary arches, they were poured with orthocal and based

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accordingly. After this, all the rugae were traced (Figure 1), photographed and transferred to a CD for analysis of rugae patterns which was done by two observers who were calibrated prior to commencement of the study. Analysis of the rugae patterns (calcorrugoscopy) was done according to Nayak *et al.*, who classified rugae into six main types namely straight, wavy, circular, curved, unified and nonspecific.[11]

Data was transferred into SPSS version 21.0¹² and descriptive statistics were applied along with application of the Chi square test to find out associations, if any.

Results



Fig. 1: Calcorrugoscopy of the dental cast model

In this study, Nayaket al [11] method was used to assess the palatal rugae pattern on the dental casts. During the examination of the palate, no two palatal rugae patterns were found identical. Each rugae were analyzed in this study and the incidence of the rugae patterns and its association with sex was tested using Chi-square test.

In males, wavy and curved rugae were found to be more prevalent followed by unification and straight patterns. Similar pattern was found in females also. Circular rugae was totally absent in females whereas only 1 circular rugae was found in the male population. (Fig 2) About 30 per cent of the total rugae patterns found are of wavy in nature in comparison to 22 % of curved form. (Fig 3) Chi-square test revealed that there was significant differences in the wavy and non-specific types of rugae pattern between males and females. (Table 1) Total incidence of rugae was found to be more in males (51 %) than in females (49 %).

Discussion

Palatoscopy, or palatal rugoscopy, is the name given to the study of palatal rugae to aid in establishing a person's identity.[1] The palatal rugae are considered to be unique for an individual and stay unchanged during one's lifetime.[2] This individuality and the exposure of palatal rugae in the body has caused this structure to be used in forensic science and to become important in identification. [13] When traffic accidents, acts of terrorism or mass disasters occur in which it is difficult to identify a person solely from the finger

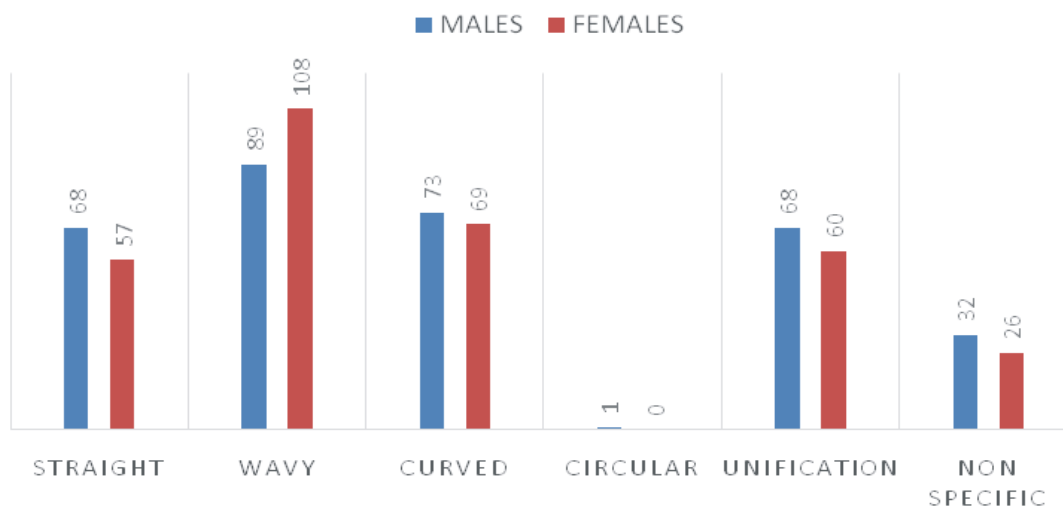


Fig. 2: Prevalence of rugae patterns in study populations