EXAMINATION OF PALATAL MUCOSAL RELIEF IN NORMAL OCCLUSION PATIENTS

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SUMMARY:

Although its discussional stability, the position of primary rugae distal edges was examined for two reasons: on one hand, it was provoked by Van der Linden's clinical study on the stable and constant position of the first rugae in relation to canines and on the other, by the lack of published research results on this issue in Bulgarian medical literature. From anatomo-topographic point of view, the first rugae are disposed just behind *sutura incisiva* with its onset between the lateral incisives and canines. Most frequently, the first ruga is fastened to the palatal suture on a quite large basis. Having in mind that the palatal mucosa and teeth have common ectodermal origin and the genetic determination of relief reveals yet in embryonic development, the elucidation of the relationship between them is of special interest. Our study on first ruga position determining the commencement of rugal zone aimed at establishing the stability of rugal position in orthodontically non-treated Class I intact dentitions and at its possible use as a reference for comparisons. Our study used the classical anthropologic method of Martin-Saller and the method of Jordanov. The study group included 80 Bulgarian students at the Faculty of Dental Medicine, Medical University – Sofia, from both sexes (42 males and 38 females) with intact dentition and normal occlusal proportions – Class ^{2} (orthognatic occlusion) and non-treated orthodontically. The analysis of mucosal relief components showed that three shapes of *papilla incisiva* were most commonly observed: *oval* (31.3%), *pear-shaped* (23.8%) and *flame-shaped* (17.5%). This corresponded with the shape types and respective frequencies found by the population study among Bulgarians. The analysis of the type of rugal zone relief showed that in normal occlusion subjects, type A (three primary rugae) was mainly observed. These data were similar to those obtained for adult Bulgarians. The distal border in normal occlusions was rather symmetric than asymmetric. Our research data for the medial rugae disposition in relation to canines revealed that almost 1/2 of the cases (38) (47.5%) displayed *bilaterally symmetric* disposition of medial (primary) ruga against the canine tooth. The medial (primary) rugae were projected in right in 92.6% of the cases and in left in 87.8% of the cases, within the limits of the canine mesiodistal diameter as the significant frequency of this position give grounds for its acceptance as a norm/reference.

Key words: first rugae, palatal mucosa, canines, rugal zone.

Although its discussional stability, the position of primary rugae distal edges was examined for two reasons: on one hand, it was provoked by Van der Linden's clinical study on the stable and constant position of the first rugae in relation to canines and on the other, by the lack of published research results on this issue in Bulgarian medical literature. In his large population study performed with his original scheme of examination of rugal zone, Jordanov (1972) described and analyzed only the distal border, *papilla incisiva* and the palatal suture and the importance of the primary rugae bound with the palatal suture but he did not reveal their concrete disposition as a medial border (rugal zone commencement).

From anatomo-topographic point of view, the first rugae are disposed just behind *sutura incisiva* with its onset between the lateral incisives and canines. Most frequently, the first ruga is fastened to the palatal suture on a quite large basis. Having in mind that the palatal mucosa and teeth have common ectodermal origin and the genetic determination of relief reveals yet in embryonic development, the elucidation of the relationship between them is of special interest. The researches show that despite the degree of relief reduction, the first (primary) rugae remain always distinctive. Our study on first ruga position determining the commencement of rugal zone aimed at establishing the stability of rugal position in orthodontically non-treated Class I intact dentitions and at its possible use as a reference for comparisons.

The classical anthropologic method of Martin-Saller and the method of Jordanov for determining *papilla incisiva* shape, palatal suture and the type of rugal zone were used in our study.

The study group included 80 Bulgarian students at the Faculty of Dental Medicine, Medical University – Sofia, from both sexes (42 males and 38 females) with intact dentition and normal occlusal relations – Class I (orthognatic occlusion) and non-treated orthodontically.

For examining the relation between the distal edge of the first ruga and the canine tooth, we designed our original method, marking the first ruga distal point as suggested by Van der Linden. The ruga projection was extended from the

distal point to the lowest point on the canine gingival margin obtained from the intersection of the line descending from the canine cusp to the gingival. This line divides the canine tooth into two parts – mesial and distal. Using a caliper with pivoted legs we assessed the proportions between the extended projection of the primary ruga and the canine in relation to the marked point. (**Fig. 1**)

With proximity to 0.05mm, the mesiodistal (MD) diameters of the right and left canines were measured for determining of their average dimensions. The distal point projection of the first ruga was determined with proximity to 0.05 mm, mesially or distally. The proportion beyond MD diameter limits was assessed as a disposition between the lateral incisive and the canine tooth or between the first premolar and the canine tooth. In cases of rugal distal edge forking, the point of the medial forking was used for it appears as a medial fold. The accuracy of this method was necessary as a biometric diagnostic tool in order to establish medial (primary) ruga position in relation to the canine tooth, which could serve as a basis for comparison with their genetic determination, the latter suggested by Peavy, D. and Kendrick, G.

The frequency of medial ruga position in relation to the canine could indicate the tooth pre-eruptive position with great accuracy. The results obtained in the study group were as follows: range of age distribution – 20 to 23 years, the time of completion of general growth of jaw-facial region.

The analysis of mucosal relief components showed that three shapes of *papilla incisiva* were most commonly observed: *oval* (31.3%), *pear-shaped* (23.8%) and *flame-shaped* (17.5%). This corresponded with the shape types and respective frequencies found by the population study among Bulgarians (Jordanov, 1972) and among pedigrees of children with no malformations (Krumova, 1987).

The results for the palatal suture shape showed that the largest number of individuals had closely disposed margins (32.5%), while fork-shaped and fused margins were equally observed (25.0%). These data were similar to those obtained for adult Bulgarians.

The analysis of the type of rugal zone relief showed that in normal occlusion subjects, type A (three primary rugae) was mainly observed. In more than 1/2 of the examined individuals (55.10%), this type of relief was found. The distribution of its various manifestations is shown on **Table 1**. Type C rugal relief (two primary rugae) was observed in 36.25% and type D or B rugal reliefs (netlike and multidirectional, respectively) only in 8.75% of the subjects. These data were similar to those obtained for adult Bulgarians.

The distal border in normal occlusions was rather symmetric than asymmetric. Most frequently, the symmetric distal border was found between the upper premolars (35%). The symmetric disposition of the last distal ruga against the upper second premolars followed (16.25%). In less cases, it terminated in the centre of the first premolar clinical crown (8.75%) or between the second upper premolar and first molar (5%). (**Table 2**)

The position of medial rugae in relation to canines was of great interest for the study. Our findings showed that in 49 (61.3%) of the cases, *the right primary ruga* was projected on the canine centre, in 24 (30.0%), it was projected 0.75-3.05mm mesially and in 6 cases (7.5%) – between the lateral incisive and the canine tooth. Only in 3 cases (3.8%), it was in the middle of the distance between the canine and the first premolar. In 53 cases (66.3%), *the left primary ruga* was projected on the canine centre, in 16 (20.0%), it was projected 0.75-2.90mm mesially, in 6 cases (7.5%) – between the lateral incisive and the canine tooth and in 5 cases (6.3%) – distally and between the canine and first premolar.

Totally, almost 1/2 of the cases (38) (47.5%) displayed *bilaterally symmetric* disposition of medial (primary) ruga against the canine tooth. In 46 (55%) individuals, the fold was symmetrically positioned, no matter in which portion of the canine mesiodistal diameter. (**Fig. 2**)

Giving no concrete evaluation of position, Van der Linden (1978) and Peavy et al. established first rugae disposition against the canines. This significantly high percentage of primary ruga symmetric position against the canine or within the limits of its mesiodistal diameter shows the strong correlation between their dispositions in intact dentition with Class I occlusal relations. Having in mind the precise teeth determination in the dental arch in normally developing dentition, the type of *sutura incisiva* disposition, the common ectodermal origin of teeth and palatal mucosa, their disposition determination seems quite possible.

With regard of canine MD-diameter mean values, 7.55 in right/7.78 in left, and the maximal observed distance from the canine centre mesially or distally, 2.80-3.20mm, the medial (primary) rugae were projected in right in 92.6% of the cases and in left in 87.8% of the cases, within the limits of canine mesiodistal diameter as the significant frequency of this position give grounds for its acceptance as a norm/reference.

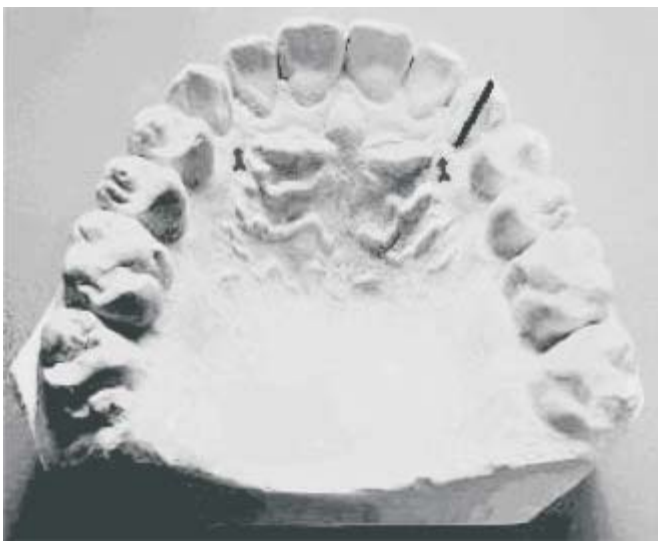


Fig. 1.

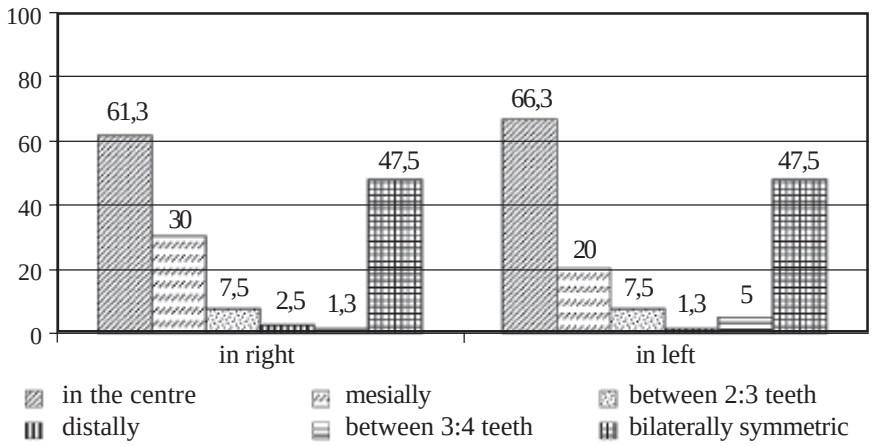
Table 1.

RUGAL ZONE IN INTACT DENTION, CLASS I															
	Three primary rugae						Two primary rugae						Net-like		
Parameter	A_{135}	A_{136}	$A_{145-146}$	A_{735}	A_{736}	$A_{745-746}$	C_{135}	C_{136}	$C_{145-146}$	C_{735}	C_{736}	$C_{745-746}$	D_1	D_2	B
Number	1	20	10	-	11	2	3	8	4	2	7	5	5	1	1
%	1.3	25.0	12.5	-	13.8	2.5	3.8	10.0	5.0	2.5	8.8	6.3	6.3	1.3	1.3
Total number	44						29						5	1	1
Total %	55.0						36.2						6.2	1.3	1.3

Table 2.

DISTRIBUTION OF RUGAL ZONE DISTAL BORDER IN INTACT DENTION, CLASS I														
	Longer in right				Symmetric					Longer in left				
Parameter	5|4	6|5|4	5|4|5	Totally	4|4	5|4|4|5	5|5	6|5|5|6	Totally	4|4|5	4|5	5|4|5	5|4|5|6	Totally
Number	3	5	4	12	7	28	13	4	52	2	5	5	4	16
%	3,75	6,255	5,0	15,0	8.75	35.0	16.25	5,0	65,0	2,5	6,25	6,25	5,0	20,0

Fig. 2. Position of medial primary rugae against the canine teeth



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