Research Article

Assessment of Palatal Height Index and palatal form in different malocclusions in adult patients visiting Nishtar Institute of Dentistry, Multan

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ABSTRACT

Introduction: This study was conducted to evaluate the palatal height index in different malocclusion because of appearance of variable palatal heights & palatal forms

Materials & Method: In this study 108 adult subjects (41 males, 67 females), age ranges from 13-28yrs, were randomly selected from Orthodontic Department In Nishtar Institute of Dentistry Multan. Their impressions were taken by the Alginate and dental casts were formed and lateral cephalograms were collected. One sample t test was used to calculate the results.

Result: Descriptive statistics showed mean palatal index of 60.95% in skeletal class I, 48.31% in skeletal class II, whereas 61.26% in skeletal class III. Frequency distribution in different skeletal patterns showed 100% high palate in class I and class III whereas skeletal class II showed variety in palatal form with 82.3% high palate, 11.3% medium palate and remaining 6.3% was low palate. major portion of the sample had high palate.

Conclusion: Mean index in Skeletal Class I is 60.95 %, 48.31% in skeletal class II, 61.26% in skeletal class III. Mean palatal height index in females is significantly higher than in males. Skeletal class II has variety of palatal form with high prevalence of high palate. Most common palatal form is high palate.

KEYWORDS: Palatal height index, Skeletal class I,II,III pattern

INTRODUCTION

Every individual is born with his unique craniofacial structural relations, craniofacial formulations & individual facial characteristics which are different from the rest of the people in the world. The palatal arch form and the palatal dimensions play a key role in assessing the facial form of a particular person and helps a lot in diagnosing if there is any orthodontic problem.[1] A generalized overview of anatomy of palate narrates that palate is the anatomical structure which is mainly composed of two components.i.e Hard palate, that is bony structure that incorporates dentition and Soft palate which is neuromuscular organ. In comparison of two components, the hard palate is supposed to be more vital structure that is associated with the speech function. If there occurs any disturbance in the formation of palate that leads to a malformation called as cleft palate and the associated problems are like difficulty in speech, narrow palatal width, narrow maxillary arch.[3] A high or narrow palate is an indicator of syndromic situations .eg .Turners syndrome, Aperts syndrome, Treacher collin syndrome, Trisomy 21 syndrome and others.[6] Due to appearance of variability in the shape of palatal vaults in each skeletal pattern we decided to conduct this study to investigate the palatal vault morphology in different malocclusions i.e. skeletal class I,II,III and to determine gender differences in adult patients coming to Orthodontics Department in Nishtar Institute of Dentistry Multan.

MATERIALS AND METHODS

The study was conducted in Nishtar Institue of Dentistry

Multan for 4 months from Dec,2019 to March, 2020. The size of sample was 108 randomly selected outdoor adult patients, age ranges from 13yrs to 28yrs. The lateral cephalograms and alginate impressions were taken. The dental casts were formed with dental stones and the cephalometric tracing was done on Acetate Matte sheets. Dental casts were selected fulfilling the following requirements:

1. First molars present.
2. Complete erupted canines
3. Casts with no bubbles, voids and repair.

The subjects were categorized on basis of ANB angle into Skeletal class I, II, III patterns. The palatal height and width were measured on the cast with reference to particular points. The shortest distance between midline at the junction of hard palate and soft palate and the horizontal plane established by the molar points is the palatal height. The distance between the maxillary molars at the cervical line was the palatal width. All the measurements were taken in millimeters. Index was calculated by the following formula
Height/Width X100

On the basis of following formula, the study conducted by Maria CM,7 the depth of palate was categorized in 3 classes:

a. ≤ 27.9% (Low palate)
b. 28.0-39.9% (Medium palate)
c. ≥40% (High palate)

The data was analyzed by using SPSS statistical software.

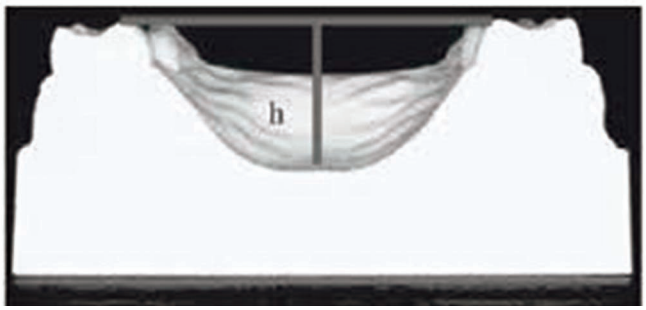

Figure 1 Palatal Height & width

RESULTS

This study comprised of 108 adult subjects in which 41 males and 67 females participated. The descriptive statistics showed mean palatal index of 60.95% in skeletal class I, 48.31% in skeletal class II, whereas 61.26% in skeletal class III. Mean palatal width and height in skeletal class I are 27.14mm and 20.84mm respectively. Mean palatal width and height are 33.9mm and 16.29mm in skeletal classII and in skeletal class III they are 28.22mm and 21.56mm respectively as shown in table 1.

Frequency distribution in different skeletal patterns showed 100% high palate in class I and class III whereas skeletal class II showed variety in palatal form with 82.3% high palate, 11.3% medium palate and remaining 6.3% was low palate.

Table 1. Mean Age, P.Width, P.Height index according to Skeletal class

Class		Age	P. Width	P. Height	Index
Class 1	Mean	17.22	27.14	20.84	60.9500
	N	37	37	37	37
	Std. Deviation	4.164	6.973	2.682	10.25515
Class 2	Mean	14.44	33.99	16.29	48.3100
	N	62	62	62	62
	Std. Deviation	1.595	3.528	3.641	12.00503
Class 3	Mean	17.00	28.22	21.56	61.2611
	N	9	9	9	9
	Std. Deviation	3.640	6.960	3.712	11.27781
Total	Mean	15.60	31.16	18.29	53.7196
	N	108	108	108	108
	Std. Deviation	3.183	6.169	4.058	12.91795

The low palate cases(index of ≤27.9%) had mean index of 23.36%,medium palate(index of 28-39.9%) had mean index of 33.85% and mean index of high palate (index of ≥40) was 56.64%. Out of 108 subjects, 96(88%) were found to have high palate, 8(7.4%) were with medium palate and remaining 4(3.7%) with low palate as shown in table 2. The average index in males was 51.12% indicating high palate and female subjects were also found to be having index of 55.30% indicating high palate. Overall mean index was 53.71% indicating major portion of the sample had high palate according to table 3.

Table 2. Mean Age P.Width P.Height index according to Palate forms

		Age	P.Width	P.Height	Index
Low palate ≤27.9%	Mean	14.75	34.50	8.00	23.3600
	N	4	4	4	4
	Std. Deviation	.500	4.655	.816	2.42447
Medium palate 28-39.9%	Mean	14.13	36.31	12.25	33.8525
	N	8	8	8	8
	Std. Deviation	.641	4.432	1.832	3.77355
High palate ≥40%	Mean	15.76	30.59	19.22	56.6402
	N	96	96	96	96
	Std. Deviation	3.336	6.140	3.143	10.29811
Total	Mean	15.60	31.16	18.29	53.7196
	N	108	108	108	108
	Std. Deviation	3.183	6.169	4.058	12.91795

The results of t test are shown in table 5. Keeping the p value as 0.05 statistically insignificant results.

Table 3. Age P.Width P.Height index according to Gender

Gender		Age	P.Width	P.Height	index
Male	Mean	15.66	32.70	18.07	51.1210
	N	41	41	41	41
	Std. Deviation	3.381	6.581	4.886	14.47405
Female	Mean	15.57	30.22	18.42	55.3099
	N	67	67	67	67
	Std. Deviation	3.081	5.752	3.491	11.69644
Total	Mean	15.60	31.16	18.29	53.7196
	N	108	108	108	108
	Std. Deviation	3.183	6.169	4.058	12.91795

Table 4. One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
index	108	53.7196	12.91795	1.24303

Table 4. One-Sample Test

	Test Value = 53.71					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
index	.008	107	.994	.00963	-2.4545	2.4738

DISCUSSION

Upcoming changes due to different treatment modalities are different for every individual because of his/her morphology so it is essential to understand every individual patient by defining his/her basic skeletal and dental structure to decide effective treatment mechanics for his/her malocclusion.

In this study, descriptive statistics showed mean palatal index of 60.95% in skeletal class I, 48.31% in skeletal class II, whereas 61.26% in skeletal class III. Mean palatal width and height in skeletal class I are 27.14mm and 20.84mm respectively. Mean palatal width and height are 33.9mm and 16.29mm in skeletal classII and in skeletal class III they are 28.22mm and 21.56mm respectively.

In 1970, Linder Aronson declared abnormal palatal height in mouth breathers.[17] In 1952, Ballard and Gwynne conducted 15 years study, mentioned that adenoid patients have high palates.[18] In 1971, Klein said that if finger sucking persist in children after two years of age might causes dome palate abnormality.[19] In 1965 Cleall and Brossman in 1972 stated that disorders of maxillar growth are important in width, depth and height.[20,21] In a study of 47 children and 47 adults conducted by Handelman in 2000, it was illustrated that palatal height increased by 18% in adults and 56% in children.[22] In 1934 Ashley Montagu developed "Palatal Index" to assess relative palatal height.[23]

Palatal height index values explained by other writers may differ from the material examined. There may be physical differences between Australian and U.S. population but different points may also explain variation in findings. Redman et al.[24] in order to avoid palatine tori, measured palatal height at junction of hard and soft palates. As this is not the deepest part of the palate, result was smaller palatal height values.

In our study, out of 108 subjects, 88% were found to have high palate, 7.4% were with medium palate and remaining 3.7% with low palate.

Different populations, ethnic backgrounds and races tend to have different palatal form and depth. According to Nurul Afiqah1 palatal height index of two populations, Malaysian and Indian were comapared and the results showed 50% of Indian population and 67% of Malaysian population showed low palate, 33% of Indian and 20% of Malaysian Population showed medium type palate, 20% Indian and 13% Malaysian population showed high palate.

CONCLUSION

This study concludes with the following observations:

1. Mean index in Skeletal Class I is 60.95 %, 48.31% in skeletal class II, 61.26% in skeletal class III.
2. Mean palatal height index in females is significantly higher than in males.
3. Skeletal class II has variety of palatal form with high prevalence of high palate.
4. Most common palatal form is high palate.

OJN

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