Angulation and Height of Canine in Different Type of Malocclusion

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Abstract

Background: Canines are unique teeth because they have certain characteristics and responsibilities. They are located in the corner of the mouth, assist the incisors in cutting and tearing food, help the posterior teeth by guiding the mandible during the action of mastication. The present study aim to determine the most common angulation and height of buccally malposed canine and determine the gender difference of the angulation and height of buccaly malposed canine measured in each side and in total samples and to study the relation between the angulation and height and the relationship of the angulation and height with the side of buccally malposed canine and with the sagittal malocclusion of dental arch.

Material and Method: The present study was a population-based, cross sectional study based on the surveying of panoramic radiographs of 11-17 years aged patient with buccally malposed canine seek orthodontic treatment in Baghdad city- Iraq. For each case, determine age and gender of the patient, as well as determine affected side and sagittal malocclusion of the dental arch. And measure angulation and height of buccally malposed canine on panoramic radiograph. T-test and F-test were used to determine gender difference (for each side and for total samples), side difference and sagittal malocclusion difference. Person correlation were used to reveal the relation between angulation and height of buccally malposed canine.

Result: The total samples is 71 sample, consist of 41 female and 30 male. The gender difference was not significant in right and left sides and in total samples. No significant difference in angle and height between the sides, as tested by t-test. . F-test reveal no significant difference among different sagittal malocclusion in angulation and in height. The Angulation and Height of buccaly malposed canine in total samples show normal distribution of samples with median, mode and mean close to each other, The person correlation between the angle and height was (-0.552) with p-value (0.000) that reveal highly significant reverse relation

Conclusion: No gender difference found in the buccally malposed canine in the right and in the left side, so the gender difference can be measured in the total samples as one unit High frequency of buccally malposed canines was reported in female than in male. The side difference was not significant in total samples, High frequency of buccally malposed maxillary canines was found in class I &II sagittal occlusion more than class III. The sagittal malocclusion difference was not significant. The Angulation and Height of buccaly malposed canine in total samples show normal distribution of samples so the mean was represent most common angulation and height of buccaly malposed canine. There are highly significant reverse relation between height and angulation, so the buccally malposed canine be more vertical as it came close to the occlusal plane

Keywords: *Canines are unique teeth because they have certain characteristics and responsibilities.*

Introduction

Human beings have four pointed teeth one on each side of the dental arch called canine or cuspid. Each canine represents the third tooth from the median line after the central and lateral incisors forming the key stone or the corner stone of the dental arch [1].

They are the longest teeth in the mouth; the crowns are usually as long as those of the maxillary central incisors, and the single roots are longer than those of any of the other teeth. The middle labial lobes have been highly developed incisally into strong, well-formed cusps (Nelson and Ash, 2015).The shape and position of the canines contribute to the guidance of the teeth into the intercuspal position by "canine guidance [2].

Development: The calcification of crown of the permanent canine begins to takes place early in life i.e. at the age of 4 to 5 month, and by the end of the first year it can be seen high in the maxilla above the bifurcation of first deciduous molar and below the floor of the orbit. From this position to the occlusal plane the path of eruption is more tortuous and difficult than any other tooth, as the root begins to form approximately at 7 years of age the canine moves towards the occlusal plane, the crown lying in close proximity to the root of the lateral incisor and emerging into the mouth at the age of 11 and 12 years. By 12 years the canine has usually reached occlusion, the lateral incisor has been.

Importance: The positions and forms of the permanent canine and their anchorage in the bone, along with the bone ridge over the labial portions of the roots, called the canine eminence, have a cosmetic value. They help form a foundation that ensures normal facial expression at the corners of the mouth. Loss of all of these teeth makes it extremely difficult, if not impossible, to make replacements that restore that natural appearance of the face for any length of time. It would therefore be difficult to place a value on the canines, and their importance is manifested by their efficiency in function, stability, and aid in maintaining natural facial expression. In function, the canines support the incisors and premolars, since they are located between these groups. The canine crowns have some characteristics of functional form, which bears a resemblance to incisor form and also to the premolar form [3].

Iteology: Sachan, Chaturvedi, [4] summarized the etiological factors of ectopic canines as followed: Early loss of deciduous teeth, Crowding of the permanent successor, Tooth size and overall arch length, High developmental position and long path of eruption and tortuous movement, Prolonged retention of the deciduous tooth, Failure of primary canine root resorption, Small or congenital missing permanent lateral incisor, Reduced in the length of the adjacent lateral incisor root, Ankylosis of permanent canine, Alveolar cleft, Malposed tooth germ, Hereditary factors, Endocrine deficiency, and Febrile diseases.

Many studies have been performed in Iraq to study the problems of the canines. Some of them took the maxillary canine as a part from the survey [5-9]. Other Iraqi studies was study impacted canine [11, 12]. Some of them concern with canine specifically. Kinaan [13] study the management of buccally malposed canine. Ghaib, [14] and Aziz, [15], study the prevalence of buccally malposed canine. Saloom,[16] and Al-Ani [17] concern with eruption course and eruptive anomalies of canine. Al-Fahdawi [18] and Aziz, [19] study the problems of the maxillary canine in Iraqi people. Al-Dabagh, [20] study buccally malposed mandibular canine in Iraqi Kurdish population.

This survey was conducted to study the angulation and height of the canine in deferent type of malocclusion.

Material and Method

The present study was a population-based, retrospective cross sectional study based on the surveying of panoramic radiographs

The study sample The samples of present study are derived from any patients seeking fixed appliance orthodontic treatment in dental hospital of university of Baghdad / collage of dentistry and private practices in Baghdad city.

Age was considered according to the last birthday giving an age range from 11 years to 17 years.

Selection criteria: The sample specification for present study are :Patient indicated for fixed appliance orthodontic treatment who have unilateral or bilateral buccally malposed canine, have complete set of maxillary permanent dentition with/without the third molars, have no extracted or congenitally missed lateral incisor or premolar, no massive interproximal caries or

restoration, and no crown or bridge restoration.

Characteristic of radiographs: Digital panoramic radiography was carried out using PM 2002 CC Proline apparatus (Planmeca, Helsinki, Finland) using imaging values between 58–68 kV and 4–10 mA, depending on the subject's size. And the magnification factor was 1:1. All re-ported measurements were adjusted according to this factor.

The study variables: The variables of present study incorporated age and gender of the patients, sagittal malocclusion class, as well as side, angulation and height of buccally malposed canine.

Inter- and intra- examiner: All panoramic radiographs were investigated by two observers in two time interval to assess intra- and inter-examiner reliability

The anatomic measures:

1. Angulation of malposed canine: The measurement of angulation of malposed canine on panoramic radiograph will be done by measure the angle between the long axis of malposed canine and the occlusal plane [21].The occlusal plane will be determined by drawing a horizontal line from the medial point of the incisal edge of the central incisal to the mesiobuccal cusp tip of the maxillary first molar. [21]. The angulation of the malposed canine will be measured lateral to the midline and recorded in degrees [22, 23].

2. The height of the malposed: Canine will be measured as length of perpendicular line extend from the occlusal plan to the cusp tip of the canine and recorded in millimeters.

Statistical analysis: Data were entered into a spreadsheet during the study period and analyzed using a commercially available statistical software package SPSS (Statistical Package for Social Sciences, version 11.0; SPSS Inc, Chicago, IL).

For statistical descriptions, means with standard deviations, were calculated and presented by gender, side and sagittal class. T-tast and f-tast use to test the difference between two and three variables, respectively. For all analyses, a P value less than (0.05) was considered statistically significant.

Result

Gender difference of the angulation and height of buccaly malposed canine measured in each side.

The samples were divided to angulation and height of buccally malposed canine in the right side and in the left side, and test gender difference in each side.

The gender difference was not significant in both sides (p >0.05), table 1

Gender difference of the angulation and height of buccaly malposed canine measured in total samples.

The total samples is 71 sample, consist of 41 female and 30 male. The mean of angle in female was slightly more than in male. The mean of height was slightly more in male than female. The gender difference was not significant in total samples (p >0.05), table 2

Angulation and Height of buccaly malposed canine with side different.

The sample consist of 32 sample with right buccally malposed canine and 39 with left. The mean of angle and the mean of height nearly similar in both sides. No significant difference in angle and height between the sides, (p >0.05), table 3.

Angulation and Height of buccaly malposed canine with sagittal malocclusion difference.

The samples consist of 26 sample with class I sagittal relation. 26 sample with class II sagittal relation and 19 sample with class III sagittal relation. F-test reveal no significant difference among different sagittal malocclusion in angulation and in height. (p >0.05), table 4.

Table 1 Gender difference of the angulation and height of buccaly malposed canine measured in each side.

Parameter	side	Descriptive Statistics			Side Difference	
		N	Mean	S.D.	t-test	p
Angle	Right	32	74.375	10.546	-0.151	0.881 (NS)
	Left	39	74.781	10.640		
Height	Right	32	4.875	4.917	-0.245	0.808 (NS)
	Left	39	5.156	4.136		

Table 2: Gender difference of the angulation and height of buccaly malposed canine measured in total samples.

Parameter	Side	Gender	Descriptive statistic			Gender Difference	
			N	Mean	S.D.	T-test	p
Angle	Right	Males	11	71.455	8.190	-1.139	0.264 (NS)
		Females	21	75.905	11.476		
	Left	Males	19	76.526	7.508	0.42	0.677 (NS)
		Females	20	74.9	15.183		
Height	Right	Males	11	5.455	5.466	0.476	0.637 (NS)
		Females	21	4.571	4.718		
	Left	Males	19	5	4.069	-0.193	0.848 (NS)
		Females	20	5.25	4.038		

Table 3: Angulation and Height of buccaly malposed canine with side different

Parameter	N	Median	Mode	Mean	S.D.	Skewness	Kurtosis	Min.	Max.
Height	71	4.00	3	5.01	4.406	1.031	.605	0	19
Angel	71	76.00	70	75.10	11.275	-.337	.944	40	102

Table 4: Angulation and Height of buccaly malposed canine with sagittal malocclusion difference.

Parameter	Class	Descriptive Statistics			Difference	
		N	Mean	S.D.	f-test	p
Angle	Class Ⅰ	26	76.615	12.599	0.786	0.460 (NS)
	Class Ⅱ	26	75.538	9.136		
	Class Ⅲ	19	72.421	12.117		
Height	Class Ⅰ	26	4.423	3.602	0.453	0.637 (NS)
	Class Ⅱ	26	5.115	4.702		
	Class Ⅲ	19	5.684	5.078		

Angulation and Height of buccaly Malposed canine in total samples

The Angulation and Height of buccaly malposed canine in total samples show normal distribution of samples with median, mode and mean close to each other, table 5.

Parameter	Genders	Descriptive Statistics			Gender Difference	
		N	Mean	S. D.	t-test	p
Angulation	Males	30	74.667	8.019	-0.274	0.785 (NS)
	Females	41	75.415	13.251		
Height	Males	30	5.167	4.542	0.248	0.805 (NS)
	Females	41	4.902	4.358		

Table 5: Angulation and Height of buccaly malposed canine in total samples.

Relation between the height and angle of buccally malposed canines

The person correlation between the angle and height was (-0.552) with p-value (0.000) that reveal highly significant reverse relation as in table 6.

Table 6: Relation between the height and angle of buccally malposed canines

Parameters	Relation	Height
Angle	r	-0.552
	p-value	0.000 (HS)

Discussion

Angulation and Height of buccaly malposed canine with gender difference measured in each side.

No gender difference found in the buccally malposed canine in the right and in the left side, so the gender difference can be measured in the total samples as one unit.

Angulation and Height of buccaly malposed canine with gender difference in total samples.

High frequency of buccally malposed canines was reported in female than in male and this agree with [24]. There is no significant difference between male and female in both angulation and height.

Angulation and Height of buccaly malposed canine with side different.

High frequency of buccally malposed canines was reported in the left side more than the right, this agree with Al-Atabi, et al, [24], Al-Huwaizi [9] and Aziz [15], and disagree with Ghaib [14].Al-Fahdawi [18] and Al-Chalabi[10]

The side difference was not significant in total samples, and this agree with **Al-Atabi, et al, [24],**

Angulation and Height of buccaly malposed canine with sagittal malocclusion difference.

High frequency of buccally malposed maxillary canines was found in class I &II sagittal occlusion more than class III; because the dominance type of occlusion is class I & II, so it is reasonable to find a higher percentage of canine problems in class I & II, sagittal occlusion.

The sagittal malocclusion difference was not significant.

Angulation and Height of buccaly malposed canine in total samples

The Angulation and Height of buccaly malposed canine in total samples show normal distribution of samples so the mean was represent most common angulation and height of buccaly malposed canine.

Relation between the height and angle of buccally malposed canines

There are highly significant reverse relation between height and angulation, so the buccally malposed canine be more vertical as it came close to the occlusal plan.

Conflict of Interest: None

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