

Mesiodistal crowns angulation in Class II division 1 malocclusion

Neam F Agha¹
BDS, MSc (Lect)

Mahmood Kh Ahmed¹
BDS, MSc (Assist Lect)

Dina A Al-Khashab²
BDS, MSc (Dent Special)

¹Dept of Pedod, Orthod and Prev Dent
College of Dentistry, University of Mosul

²Ninevah Health Directorate
Ministry of Health

ABSTRACT

Aims: To evaluate the mesiodistal angulation of the crowns in 50 study models (25 for each sex) of Class II division 1 malocclusion and compare it to 38 study models (19 for each sex) of Class I normal occlusion to find the differences between the two groups so as to provide valuable information in the treatment of Class II division 1 malocclusion. **Materials and Methods:** Mesiodistal crown angulation is measured as the angle formed between the long axis of the crown and a line perpendicular to the occlusal plane. The data subjected to statistical analysis at $p < 0.05$. Descriptive statistics (mean, standard deviation, minimum, maximum), correlation for all the crowns and comparison between right and left side, male and female and between Class I and Class II were carried out. **Results:** Significant differences in the angulation of the crowns between the two classes in the buccal segment of the upper dental arches for both sexes with significant higher values in Class II division 1 were found. For the lower arch there were significant differences in central, lateral incisors and second premolar in males and in all crowns except first molar in females with significant higher values in Class II division 1 indicating that the crowns are more mesially inclined in Class II division 1 malocclusion. **Conclusion:** The crowns were more mesially inclined for Class II division 1 malocclusion than for Class I occlusion. There was a correlation among teeth in each quadrant.

Key Words: Mesiodistal, angulation, Class II division 1.

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INTRODUCTION

Class II division 1 malocclusion represents the second most common type of malocclusion after crowding⁽¹⁻⁴⁾ and it is the most frequently seen skeletal disharmony in orthodontic population.⁽⁵⁾

In Iraq a study carried out in Mosul City showed that Class II malocclusion represents 18.7% of the population⁶ while other study performed on rural community showed that 10.4 % of the population had Class II malocclusion.⁽⁷⁾

It is characteristic for the teeth to have varying degrees of mesial inclination, the gingival portion of the long axis of the crown more distal than the incisal portion^(8,9) and it is one of the means by which they are kept in tight contact.⁽¹⁰⁾

Each non orthodontic normal model had a distal inclination of the gingival portion of each crown. It varied with each tooth type, but within each type the tipping pattern was consistent from individual to individual.⁽⁸⁾

Normal occlusion is dependent upon proper distal crown tipping especially of the upper anterior teeth. Since rectangle occupies a wider space when tipped than when upright, thus the degree of tipping determines the amount of mesiodistal space that they consume and therefore, has a considerable effect on posterior occlusion as well as anterior esthetic⁽⁸⁾ and arch length.⁽¹¹⁾

In orthodontics, angulation of the teeth is an important part of alignment of tee-

th⁽¹²⁾ normalizing occlusion involves many factors that include normalizing mesiodistal angulation and labiolingual inclination of the teeth. These arrangements are crucial in closing and consolidating the interdental spaces and obtaining an ideal overbite-over jet relationship.⁽¹¹⁾

On completion of orthodontic treatment, it is common practice to assess mesiodistal angulation of the teeth in the dental arches. This is especially important in case in which extraction of dental units was performed as part of treatment with these spaces being subsequently closed by orthodontic means,⁽¹³⁾ and normal angulation and inclination of the teeth were better achieved with the Roth appliance.⁽¹⁴⁾

Several methods may be used to assess the mesiodistal angulations of the teeth including direct assessment of the axial inclination of the clinical crowns but it offers limited information for diagnosing dental irregularities,⁽¹⁵⁾ some researchers used study cast which is the only method that can provide three dimensional reproduction of the dentition,⁽¹⁶⁾ radiographic techniques were also used to determine the axial inclination of the teeth including intraoral periapical radiograph,⁽¹⁷⁾ extra oral oblique cephalogram,⁽¹⁸⁾ and the orthopantomograph could be used.^(9, 19)

This study was directed to evaluate mesiodistal crowns angulation in Class II division 1 malocclusion, to compare these angulations with those of Class I normal occlusion, to assess the correlation coefficient between the measured values of the mesiodistal crown angulation for both upper and lower dental arches in males and females and also to know how much mesiodistal angulation required for correction during or after retraction in such malocclusion.

MATERIALS AND METHOD

The sample consisted of 50 dental models of Class II division 1 malocclusion, 25 for each sex, with bilateral Class II molar and canine relationships and over jet more than 5 mm.^(20, 21) The models were taken from patients aged 13–16 years. Thirty eight dental models of Class I normal occlusion selected from the private clinics,

19 for each sex, with bilateral Class I molar and canine relationships and normal over jet and overbite 2–4 mm.^(22, 23) In both groups, the models with well aligned full complement of permanent dentition including incisors, canines, premolars and first molars.

The method of measuring mesiodistal crowns angulation was done by placing the occlusal plane of the study model on the dental surveyor, then marking the center of cervical line for all the teeth and the center of incisal edge for anterior teeth and the center of occlusal plane for posterior teeth. Then connecting the two center points by a line which represent the long axis of the crown^(8, 12) (Figure 1).

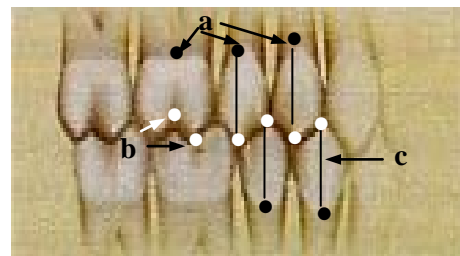
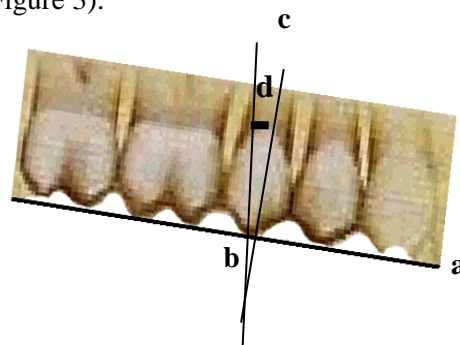


Figure (1): The long axis of the crown

A: Center of cervical line, b: Center of occlusal plane of posterior teeth, c: The long axis of the tooth

The amount of crown angulation recorded by the protractor (Figure 2) after adjusting the surveyor parallel to the horizontal plane and measure the mesiodistal angulation in which one arm of geometric device fixed on the plate of surveyor and the vertical line of the other arm (moveable arm) place on the long axis of the crown (Figure 3).



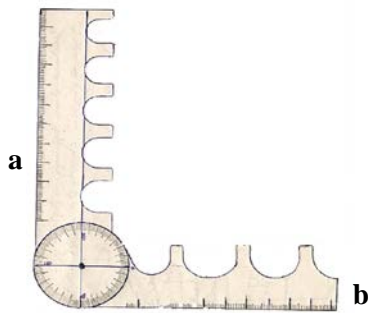


Figure (3): The protractor used in the study

A: Movable arm, b: Fixed arm

The records were expressed as positive (+ve) which means mesially inclined crown or negative (-ve) record which means distally inclined crown. The procedure was done for all the teeth of the dental arch right and left sides, upper and lower arches for both genders.

The data were subjected to statistical analysis using Minitab statistical program and this included: Descriptive statistics (means, standard deviation, minimum and maximum values), correlation of all the

mesiodistal crowns angulation, and Student's t-test to differentiate between right and left, males and females. Results were considered as significant when $p \leq 0.05$.

RESULTS AND DISCUSSION

Tables (1) and (2) demonstrated the comparison between right-left sides teeth angulations of upper and lower dental arches for males and females, respectively. There was insignificant difference between right and left sides for both males and females and this result came in agreement with Al-Dewachi,⁽⁹⁾ although his study carried out on adults of Class I normal occlusion using panoramic radiograph. Bilateral symmetry also noted by Farah⁽²⁴⁾ in a study on the angulation of the developing maxillary canines and by Alwash⁽²⁵⁾ in her study on the developmental position of mandibular canine, first, second premolars, first and second molars, so that the combined means (right and left) for the description of the variables and for comparison between males and females were taken.

Table (1): Comparison between right-left sides crowns angulations of males upper and lower dental arches in Class II division 1 malocclusion.

Teeth	Side	Upper				Lower			
		Mean	± SD	t-value	Significance	Mean	± SD	t-value	Significance
Central	R	3.75	2.91	1.24	Not Significant	0.73	1.64	0.22	Not Significant
	L	2.85	3.27			0.63	1.65		
Lateral	R	6.58	4.30	1.32	Not Significant	0.70	1.41	-0.5	Not Significant
	L	5.58	3.46			1.13	2.28		
Canine	R	5.75	4.28	0.61	Not Significant	-0.3	3.75	-0.99	Not Significant
	L	4.94	4.01			0.87	4.1		
First Premolar	R	2.95	3.53	0.39	Not Significant	2.75	3.67	-0.98	Not Significant
	L	2.48	3.05			2.38	4.45		
Second Premolar	R	1.89	3.01	0.28	Not Significant	2.53	2.44	-0.28	Not Significant
	L	1.73	2.71			2.80	3.85		
First Molar	R	1.68	2.96	0.42	Not Significant	2.70	2.40	-0.94	Not Significant
	L	1.28	2.56			3.77	3.99		

R: Right, L: Left, SD: Standard deviation.

Table (2): Comparison between right-left sides crowns angulations of females upper and lower dental arches in Class II division 1 malocclusion

Teeth	Side	Upper				Lower			
		Mean	± SD	t-value	Significance	Mean	± SD	t-value	Significance
Central	R	3.68	3.27	1.36	Not Significant	1.10	1.65	-1.06	Not Significant
	L	2.38	2.28			1.75	1.61		
Lateral	R	5.33	3.46	1.22	Not Significant	0.83	2.28	0.45	Not Significant
	L	4.28	2.47			1.18	1.77		
Canine	R	5.20	4.03	0.4	Not Significant	1.4	4.1	0.52	Not Significant
	L	4.20	4.26			2.3	4.35		
First Premolar	R	2.23	3.05	0.32	Not Significant	1.35	4.45	0.74	Not Significant
	L	1.93	2.69			1.85	3.41		
Second Premolar	R	2.75	3.68	1.45	Not Significant	2.23	3.85	1.18	Not Significant
	L	1.63	1.25			2.30	3.88		
First Molar	R	1.68	2.56	1.17	Not Significant	3.08	3.99	1.28	Not Significant
	L	1.10	2.71			3.73	3.86		

R: Right, L: Left, SD: Standard deviation.

Table (3) for description of mesiodistal crowns angulations of upper dental arch revealed that the females have larger mean value for upper central incisors than males. Also the female have larger record (maximum) for this crown than the males. In Class II division 1 malocclusion there was an increase in the over jet, and soft tissue appeared to play a role in the determination of the final position of incisors if hypoton-

ic muscles of upper lip then lead to proclination of incisors or if hypertonic muscle, stretched, upper lip will pushing the incisors palatally to yield division two. So, the hypotonic of female lip gave the higher records in the data and the mean value.

Also the females have slightly larger records for upper first molar than males. The males have larger records for the other crowns.

Table (3): Description of Mesio-distal crowns angulations of upper dental arch in Class II division I malocclusion

Teeth	Sex	Mean	± SD	Minimum	Maximum
Central	M	2.41	2.91	0.0	9.0
	F	3.01	3.27	0.0	13.0
	T	2.91	2.81	0.0	13.0
Lateral	M	5.58	4.30	0.0	20.0
	F	4.30	3.46	0.0	11.0
	T	4.94	4.10	0.0	20.0
Canine	M	5.30	4.28	0.0	14.0
	F	4.31	4.01	0.0	14.0
	T	5.03	4.10	0.0	14.0
First Premolar	M	2.95	3.53	-4.0	12.0
	F	2.23	3.05	0.0	9.0
	T	2.39	3.34	-4.0	12.0
Second Premolar	M	1.98	3.01	-2.0	11.0
	F	0.63	2.71	0.0	15.0
	T	1.77	2.84	-2.0	15.0
First Molar	M	1.58	2.96	-2.0	13.0
	F	1.68	2.56	-7.0	9.0
	T	1.18	2.85	-7.0	13.0

SD: Standard deviation, M: Male, F: Female, T: Total.

Table (4) for description of crowns angulation for lower dental arch showed that males have slightly larger mean value for second premolar and larger records (maximum) than females. For the other crowns, females have larger records. There was no previous researches taking the mesiodistal crowns angulation directly from the study casts. All the studies measured this variable on x-ray films, usually they take panoramic films, and measured

the mesiodistal angulation with the occlusal plane, so the record values round 90°. In Mosul City, only Al-Dewachi⁽⁹⁾ research took mesiodistal angulation, but he took panoramic films, and the sample on adult patients having Class I normal occlusion. This research is considered the first one on measuring the mesiodistal angulation directly on study models and on Class II division 1 malocclusion.

Table (4): Description of Mesio-distal crowns angulations of lower dental arch in Class II division I malocclusion

Teeth	Sex	Mean	± SD	Minimum	Maximum
Central	M	0.73	1.64	0.0	6.0
	F	1.1	1.65	0.0	7.0
	T	1.53	1.63	0.0	7.0
Lateral	M	0.70	1.41	-13.0	7.0
	F	0.83	2.28	-13.0	7.0
	T	0.74	2.88	-13.0	7.0
Canine	M	-0.3	3.75	-13.0	8.5
	F	1.4	4.1	-4.0	15.0
	T	0.96	3.88	-13.0	15.0
First Premolar	M	0.87	3.67	-4.0	10.0
	F	1.35	4.45	-1.0	13.0
	T	1.69	3.61	-4.0	13.0
Second Premolar	M	2.53	2.44	0.0	10.0
	F	2.30	3.85	-12.0	14.0
	T	2.18	3.04	-12.0	14.0
First Molar	M	2.7	2.40	0.0	14.0
	F	3.08	3.99	0.0	13.0
	T	2.58	3.46	0.0	14.0

SD: Standard deviation, M: Male, F: Female, T: Total.

In Table (5), comparison between sexes for each quadrant was done and no significant difference was found. Similar results were found in the Tables (6) and (7) for comparison of combined (right-left) sides crowns angulations between males-females upper and lower dental arches respectively and revealed no significant differences between sexes for upper and lower dental arches. This result came in accordance with Al-Dewachi,⁽⁹⁾ who found no significant difference in the mesiodistal crowns angulation between the two sexes except for first mandibular premolar and first mandibular molar and this difference may

be due to difference in sample age, occlusion type and method of measurement.

Table (8) showed the correlation of the teeth in the upper dental arch. A high correlation between (lateral-canine) and (second premolar-first molar) was found. A moderate correlation was found between (central-lateral), (canine-first premolar), (first-second premolars), (first premolar-first molar). From these relations, it could be concluded that all the teeth correlated with each other; an increase in the angulations of one segment of the dental arch will be accompanied by an increase in the angulation in the other segment.

Table (5): Comparison of crowns angulation between male and female for right and left sides in upper and lower dental arch in Class II division 1 malocclusion

Teeth	Sex	Upper				Lower					
		Mean(°)	± SD	t-value	Significance	Mean(°)	± SD	t-value	Significance		
Right	Central	M	3.75	2.91	0.08	Not Significant	0.73	1.64	-0.79	Not Significant	
		F	3.68	3.27			1.10	1.65			
	Lateral	M	6.58	4.30	1.13	Not Significant	0.70	1.41	-0.19	Not Significant	
		F	5.33	3.46			0.83	2.28			
	Canine	M	5.75	4.28	0.47	Not Significant	-0.3	3.75	-1.53	Not Significant	
		F	5.20	4.03			1.40	4.1			
	First Premolar	M	2.95	3.53	0.77	Not Significant	2.75	3.67	1.21	Not Significant	
		F	2.23	3.05			1.35	4.45			
	Second Premolar	M	1.89	3.01	-0.91	Not Significant	2.53	2.44	0.33	Not Significant	
		F	2.75	3.68			2.23	3.85			
	First Molar	M	1.68	2.96	0.00	Not Significant	2.70	2.40	-0.41	Not Significant	
		F	1.68	2.56			3.08	3.99			
	Left	Central	M	2.85	3.27	0.59	Not Significant	0.63	1.65	-1.43	Not Significant
			F	2.38	2.28			1.70	1.61		
Lateral		M	5.58	3.46	1.53	Not Significant	1.13	2.28	-0.09	Not Significant	
		F	4.28	2.47			1.18	1.77			
Canine		M	4.94	4.01	0.63	Not Significant	0.87	4.1	-1.19	Not Significant	
		F	4.20	4.26			0.80	4.35			
First Premolar		M	2.48	3.05	0.68	Not Significant	2.38	4.45	0.47	Not Significant	
		F	1.93	2.69			1.85	3.41			
Second Premolar		M	1.73	2.71	0.17	Not Significant	2.80	3.85	0.46	Not Significant	
		F	1.63	1.25			2.30	3.88			
First Molar		M	1.28	2.56	0.24	Not Significant	3.77	3.99	0.04	Not Significant	
		F	1.10	2.71			3.73	3.86			

SD: Standard deviation, M: Male, F: Female.

Table (6): Comparison of combined right-left sides crowns angulations of males-females upper dental arches in Class II division 1 malocclusion

Teeth	Sex	Mean	± SD	t-value	Significance
Central	M	2.41	2.91	-0.35	Not Significant
	F	3.01	3.27		
Lateral	M	5.58	4.30	1.40	Not Significant
	F	4.30	3.46		
Canine	M	5.30	4.28	0.7	Not Significant
	F	4.31	4.01		
First Premolar	M	2.95	3.53	0.85	Not Significant
	F	2.23	3.05		
Second Premolar	M	1.98	3.01	0.25	Not Significant
	F	0.63	2.71		
First Molar	M	1.58	2.96	0.92	Not Significant
	F	1.68	2.56		

SD: Standard deviation, M: Male, F: Female.

Table (7): Comparison of combined right-left sides crowns angulations of males-females lower dental arches in Class II division 1 malocclusion

Teeth	Sex	Mean	± SD	t-value	Significance
Central	M	0.73	1.64	-3.07	Significant
	F	1.1	1.65		
Lateral	M	0.70	1.41	0.54	Not Significant
	F	0.83	2.28		
Canine	M	-0.3	3.75	-1.56	Not Significant
	F	1.4	4.1		
First Premolar	M	2.75	3.67	-0.32	Not Significant
	F	1.35	4.45		
Second Premolar	M	2.53	2.44	1.43	Not Significant
	F	2.23	3.85		
First Molar	M	2.7	2.40	1.73	Not Significant
	F	3.08	3.99		

SD: Standard deviation, M: Male, F: Female.

Table (8): Correlation of crowns angulations of upper dental arch in Class II division 1 malocclusion

Teeth	Sex	Central	Lateral	Canine	First Premolar	Second Premolar
Lateral	M	0.50				
	F	0.44				
	T	0.46				
Canine	M	0.13	0.53			
	F	0.21	0.69			
	T	0.22	0.61			
First Premolar	M	-0.06	0.20	0.40		
	F	-0.19	0.16	0.42		
	T	-0.14	0.20	0.41		
Second Premolar	M	-0.18	-0.06	0.12	0.41	
	F	0.14	0.18	0.08	0.44	
	T	0.16	0.12	0.09	0.43	
First Molar	M	-0.13	0.04	0.29	0.45	0.73
	F	0.02	0.34	0.31	0.41	0.67
	T	0.13	0.16	0.30	0.43	0.70

M: Male, F: Female, T: Total.

Similarly, Table (9) revealed the correlation of the teeth in the lower dental arch. A moderate correlation was found between (central-lateral), (lateral-canine), (first premolar with both lateral and canine), (first premolar-first molar), while in Table (10) for correlation of upper and lower dental arches a weak correlation existed among upper and lower crowns.

From these three Tables (8-10) it could be noticed that there was a correlation between the teeth in the anterior segment and there was a correlation between the teeth

in the posterior segment but less correlation was present between the anterior and posterior segment. There was a significant intraarch correlation, a moderate correlation between crowns in the upper arch and in the lower arch but there was insignificant interarch correlation. This may be related to the position of the teeth within the basal bone. In case of Class II division 1 malocclusion in which the cause of malocclusion may be skeletal in the maxilla or the mandible and not to dental cause, that is why the teeth will be affected by the grow-

th pattern of its basal bone.

In Table (11) comparison between Class I–Class II crowns angulations of males in upper and lower dental arches was noticed. There was a significant difference in the buccal segment of upper arch (canine, first and second premolars and first molar) that the mean value was larger in Class II than in Class I which means more mesially angulated crowns in Class II. This gives

idea that the cause of this malocclusion is the dental arch. For the lower arch there was significant difference for central, lateral and the second premolar. From these results, it could be noted that the upper and lower crowns were more mesially angulated in Class II division 1 malocclusion.

Table (9): Correlation of crowns angulations of lower dental arch in Class II division 1 malocclusion

Teeth	Sex	Central	Lateral	Canine	First Premolar	Second Premolar
Lateral	Male	0.44				
	Female	-0.34				
	Total	-0.39				
Canine	Male	0.24	0.42			
	Female	0.08	0.38			
	Total	0.16	0.40			
First Premolar	Male	0.07	0.44	0.36		
	Female	0.12	0.49	0.57		
	Total	0.10	0.47	0.46		
Second Premolar	Male	-0.12	0.12	0.28	0.38	
	Female	-0.21	0.12	0.26	0.27	
	Total	-0.14	0.12	0.27	0.32	
First Molar	Male	-0.19	0.12	0.15	0.26	0.55
	Female	-0.07	0.08	0.05	0.12	0.45
	Total	-0.20	0.09	0.08	0.15	0.50

Table (10): Correlation of crowns angulations of upper–lower dental arch in Class II division 1 malocclusion

Teeth	Sex	Upper						
		Central	Lateral	Canine	First Premolar	Second Premolar	First Molar	
Lower	Central	Male	-0.0	-0.1	0.23	0.17	0.21	-0.03
		Female	-0.29	-0.4	-0.18	0.01	-0.19	-0.5
		Total	-0.15	-0.2	-0.20	0.09	-0.20	-0.21
	Lateral	Male	0.05	0.18	0.37	0.18	0.18	0.21
		Female	-0.07	0.05	-0.04	0.26	-0.01	0.10
		Total	-0.06	0.11	-0.21	0.22	-0.90	0.16
	Canine	Male	0.01	0.11	-0.44	-0.03	-0.15	-0.18
		Female	-0.35	0.10	0.18	-0.14	-0.25	0.25
		Total	-0.20	0.10	-0.31	-0.08	-0.20	-0.22
	First Premolar	Male	-0.32	0.01	0.06	0.37	0.12	0.18
		Female	-0.35	0.16	0.07	0.19	-0.19	0.10
		Total	-0.33	0.04	0.06	0.28	-0.15	0.14
	Second Premolar	Male	-0.10	-0.02	0.05	0.05	0.01	-0.05
		Female	-0.17	0.13	-0.03	0.25	-0.01	0.21
		Total	-0.13	-0.07	-0.04	0.15	0.01	-0.13

First Molar	Male	-0.24	v0.1	0.13	0.04	0.33	0.34
	Female	-0.12	0.4	0.24	0.27	0.08	0.07
	Total	-0.20	0.3	0.16	0.17	0.16	0.21

Table (11): Comparison between Class I–Class II crowns angulations of males upper and lower dental arches

Teeth	Class	Mean	± SD	t-value	Significance	Upper		Lower	
						Mean	± SD	t-value	Significance
Central	I	2.72	2.26	0.12	Not Significant	-1.21	1.38	5.95	Significant
	II	2.41	2.91			0.73	1.65		
Lateral	I	5.62	3.29	-0.05	Not Significant	-1.50	2.09	2.45	Significant
	II	5.58	4.30			0.70	1.41		
Canine	I	2.97	3.21	2.70	Significant	1.07	2.87	-0.99	Not Significant
	II	5.30	4.28			-0.3	3.75		
First Premolar	I	1.17	1.98	2.19	Significant	0.19	2.53	0.98	Not Significant
	II	2.95	3.53			0.87	3.67		
Second Premolar	I	0.62	2.03	2.12	Significant	0.33	1.70	3.81	Significant
	II	1.98	3.01			2.53	2.44		
First Molar	I	0.21	3.13	1.99	Significant	1.95	3.13	1.31	Not Significant
	II	1.58	2.96			2.7	2.40		

SD: Standard deviation.

Similar results were found for females as could be seen in Table (12) for comparison between Class I–Class II crowns angulations of females. In the upper dental arches, there was significant difference for buccal teeth like in males except for the central and lateral incisors. The difference was insignificant, but the mean values were larger in Class II than in Class I. For the lower crowns there was significant difference for all the crowns except for first mol-

ar which was insignificant. The mean values for crowns angulation were higher in Class II malocclusion than in Class I sample of this research. Also, it was higher than the values found by Al–Dewachi⁽⁹⁾ for Class I normal occlusion and higher than the documented values for brackets angulation established by other studies.^(26–28) This supports the results of this study that the teeth were more mesially angulated in Class II malocclusion.

Table (12): Comparison between Class I–Class II crowns angulations of females upper and lower dental arches

Teeth	Class	Mean	± SD	t-value	Significance	Upper		Lower	
						Mean	± SD	t-value	Significance
Central	I	3.11	1.25	0.98	Not Significant	-0.01	1.38	3.95	Significant
	II	3.01	3.27			1.10	1.65		
Lateral	I	4.31	2.53	-1.05	Not Significant	-0.26	1.95	4.95	Significant
	II	4.30	3.46			0.83	2.28		
Canine	I	1.30	1.36	3.66	Significant	1.07	0.86	2.11	Not Significant
	II	4.31	4.01			1.40	4.10		
First Premolar	I	0.74	1.27	2.43	Significant	0.19	2.11	2.40	Not Significant
	II	2.23	3.05			1.35	4.45		
Second Premolar	I	0.57	1.58	2.58	Significant	0.46	0.70	3.82	Significant
	II	2.63	2.71			2.30	3.85		

First	I	-3.90	3.06				0.34	2.52		Not
Molar	II	1.68	2.56	6.93	Significant		1.08	3.99	1.31	Significant

SD: Standard deviation.

CONCLUSION

The crowns were more mesially angulated in Class II division malocclusion and this fact must be taken in consideration during correction of this type of malocclusion.

All the crowns correlated with each other, an increase in the angulation of one segment of the dental arch will affect on the other segment.

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