Comparison of arch width, alveolar width and buccolingual inclination of teeth between Class II division I malocclusion and ClassI occlusion with average growth pattern

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Abstract: The purpose of this study is to investigateif transverse discrepancies in class II div 1 is a dental problem or a skeletal problem. Keeping with the findings of this study treatment plan can be, slow maxillary expansion or rapid maxillary expansion in class II div 1 patient. MATERIAL AND METHOD: Maxillary and mandibular pretreatment dental casts of 50 patients (25 male and 25 female) age range 16 to 23 with Class II div 1 malocclusion attending at the OPD of Department of orthodontics and Dentofacial Orthopeadics of Guru Nanak Institute of Dental Sciences and Research and Maxillary and mandibular dental casts of 50 undergraduate students (25 male and 25 female) age range 16 to 23 with Class I normal occlusion of same teaching institution were evaluated in this study. Buccolingual inclination of bilateral maxillary and mandibular first molars, first and second premolars measured. intermolar width, first premolar width and second premolar width between the FA point of bilateral maxillary and mandibular second premolars is also measured. Mandibular alveolar width between the WALA point below the FA point of bilateral first mandibular molars and first and second premolars. Results:Arch width of maxillary 1st premolar and 1st molar of class II div 1 group are significantly smaller than class I group.There is no statistically significant difference of arch width and alveolar width of maxillary 2nd premolar and mandibular premolars and 1st molar of class II div 1 group and class I group. Maxillary premolars and 1st molar, and mandibular 1st molar are more lingualy inclined in class II div 1 group compare to class I. This difference is statistically significant. There is no statistically significant difference of buccolingual inclination of mandibular premolars.Conclusion: Means transverse discrepancies in class II div 1 is a dental problem not a skeletal problem. In keeping with the finding of this study it can be inferred that slow maxillary expansion are more indicated than rapid maxillary expansion in class II div 1 patient.
Key words: buccolingual inclination, class II divI, arch width, alveolar width.

I. Introduction:

Buccolingual tooth inclination is one of Andrew's Six Keys to Normal Occlusion[1]. The American Board of Orthodontics (ABO)[2] states that in order to establish proper occlusion in maximum intercuspation and avoid balancing interferences, there should not be a significant difference between heights of the buccal and lingual cusps of the maxillary and mandibular molars and pre-molars. TheClass II division 1 malocclusion is one of the most common case in orthodontic clinical practice[3,4,] with a prevalence ranging between 5% and 29%[5]. Transverse component in Class II patients is of as great importance as the sagittal or vertical components[8]. Some of the authors evaluating transverse dimensions had reported that maxillary arch was narrower in patients with Class II division 1 malocclusion, and an expansion was needed during or before treatment[9]. Some studies reported that the deficient transverse growth of the maxilla and the sagittal growth of the mandible appeared to cause the typical Class II occlusion. . Staley et al.[5] also stated that patients with Class II division 1 malocclusion had narrower maxillary intercanine, intermolar, and alveolar widths. However, in one of the earlier studies, Frohlich[17] found no difference in transverse dimension between Class I and Class II subjects.

AIMS AND OBJECTIVES OF THE STUDY

Comparison of arch width, alveolar width, buccolingual inclination of premolars and 1st molar between Class II division 1 malocclusion group and Class I occlusion group.

II.   Material And Method

Maxillary and mandibular pretreatment dental casts of 50 patients (25 male and 25 female) age range 16 to 23 with Class II div 1 malocclusion attending at the OPD of Department of orthodontics and Dentofacial Orthopeadics of Guru Nanak Institute of Dental Sciences and Research and Maxillary and mandibular dental casts of 50 undergraduate students (25 male and 25 female) age range 16 to 23 with Class I normal occlusion of same teaching institution were evaluated in this study.

THE INCLUSION CRITERIA FOR CLASS II DIV 1 (50 SAMPLE):
(1)   The mesiobuccal cusps of maxillary first molars were mesial to the mesiobuccal groove of the corresponding mandibular first molars bilaterally.
(2)   Full complement of permanent dentition with fully erupted first premolars, second premolars, and first molars.
(3)   Class II skeletal relationship with ANB angle $>5^0$ in cephalometric analysis.
(4)   FMA angle should be between 22^0 -28^0.
(5)   Good periodontal condition.

THE INCLUSION CRITERIA FOR CLASS I OCCLUSION (50 SAMPLE) :
(1)   Bilateral Class I molars and canines in centric occlusion relationship.
(2)   Full complement of permanent dentition with fully erupted first premolars, second premolars, and first molars.
(3)   Class I skeletal relationship with 0^0 < ANB angle < 5^0 in cephalometric analysis.
(4)   FMA angle should be between 22^0 -28^0.
(5)   Good periodontal condition.

THE EXCLUSION CRITERIA FOR CLASS I& CLASS II OCCLUSION (50 SAMPLE EACH):
(1)   Patients with history of orthodontic, prosthodontic, or orthognathic treatment.
(2)   Crowding > 2mm, crossbite, rotation of tooth/teeth in the arch.
(3)   Occlusion with missing teeth except 3rd molar.
(4)   Any abrasion or defect on the buccal surface of the premolars and first molars under the naked eye.

MATERIAL USED:-
1.   Well fabricated maxillary and mandibular casts of each individual. (Fig: 1,2)
2.   Lateral cephalograms were taken for each individual and tracing performed on .003 inch acetate tracing paper.
3.   Scale (Fig:3)
4.   Protractor for measuring angle.(Fig:3)
5.   Pencil and Rubber (Fig:3)
6.   Occlusal plate (Fig:3)
7.   A digital caliper with minimal accuracy of 0.02 mm used to measure the arch width and alveolar width. (Fig: 4)
8.   Modified protractor as per the requirements of the study used to measure buccolingual inclination. (Fig: 5)

FOLLOWING MEASUREMENT WERE MADE:-
The facial axis of clinical crown (FACC) and its midpoint, the facial-axis point (FA point) point, were marked on the buccal surface as described by Andrews and were used to measure the buccolingual inclination.
These measurements were taken from the trimmed casts:(Fig 6,7)
*   buccolingual inclination of bilateral maxillary and mandibular first molars;
*   buccolingual inclination of bilateral maxillary and mandibular first and second premolars;
*   intermolar width between the FA point of bilateral maxillary and mandibular first molars;
*   first premolar width between the FA point of bilateral maxillary and mandibular first premolars;
*   second premolar width between the FA point of bilateral maxillary and mandibular second premolars;
*   maxillary alveolar width between the mucogingival junctions above the FA point of bilateral first maxillary molars;
*   maxillary alveolar width between the mucogingival junctions above the FA point of bilateral first and second maxillary premolars;
*   mandibular alveolar width between the WALA point below the FA point of bilateral first mandibular molars; and
*   mandibular alveolar width between the WALA point below the FA point of bilateral first and second premolars.

Descriptive and analyticalstatisticswere done.The normality of data was tested by Shapiro-Wilk test. As the data followed normal distribution parametric tests were used to analyze the data. The independent sample (un-paired)

t-test was used to check differences between groups using SPSS (StatisticalPackagefor Social Sciences) Version 20.1 (IBM Corporation, Chicago, USA) software.
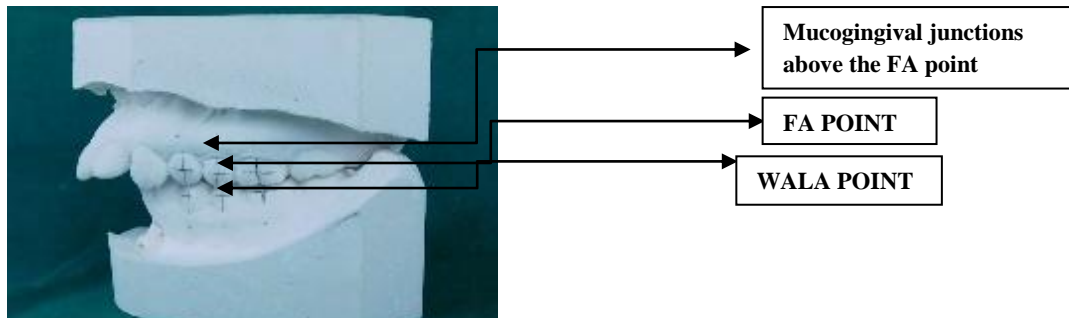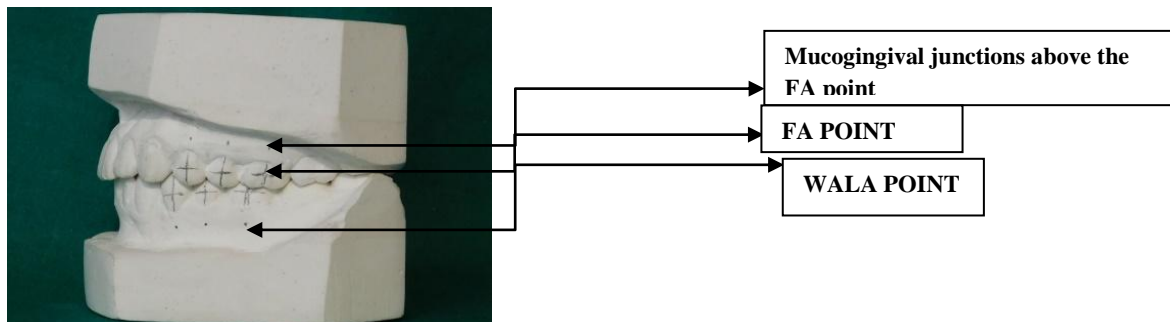

Fig- 1: Study model of class II div 1
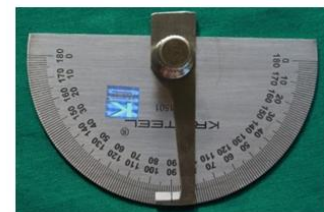

Fig 2: Study model class I

Fig 3: scale, pencil, eraser, Fig 4: Digital caliper Fig 5: Modified protractor protractor, occusal plate
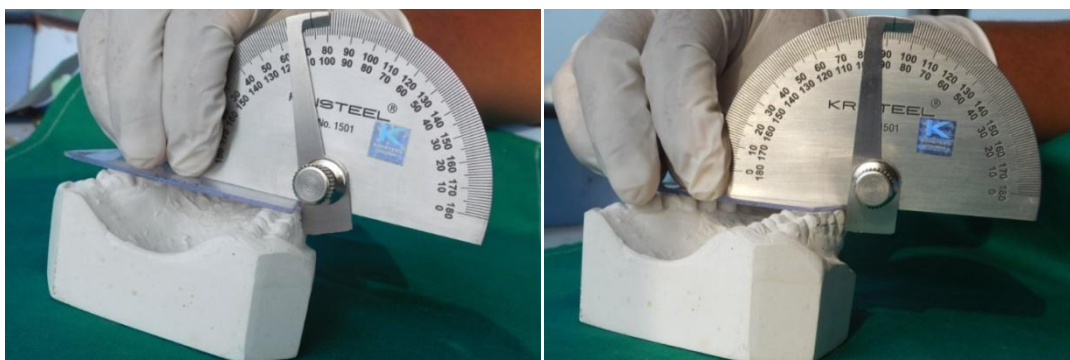

Fig6: measurement of buccolingual inclination of premolars and 1ˢᵗ molar

Fig 8: Measurement of arch width of premolars and 1ˢᵗ molarFig 9: measurement of alveolar width of premolars and 1ˢᵗmolar

III. Results

COMPARISON OF BUCCOLINGUAL INCLINATION OF MAXILLARY PREMOLARS AND MOLAR BETWEEN CLASS II DIV 1 AND CLASS I

Buccolingualinclinationofmaxillaryfirst premolar (BLIMXT4) (Table-2, bar diagram -1)-Mean value of BLIMXT4 in class II div 1 group is 12.87 ± 6.24, and mean value of BLIMXT4 in class I group is 8.39 ± 5.47, BLIMXT4 were significantly larger in Class II, division 1 group than Class I group ($P < .001$).

Buccolingualinclinationofmaxillary 2nd premolar(BLIMXT5)(Table-2, bar diagram -1) Mean value of BLIMXT5 in class II div 1 group is 13.88±5.73, and mean value of BLIMXT5 in class I group is 8.04±5.47, BLIMXT5 were significantly larger in Class II, division 1 group than Class I group ($P < .001$).

Buccolingualinclinationofmaxillaryfirst molar(BLIMXT6)(Table-2, bar diagram -1) Mean value of BLIMXT6 in class II div 1 group is 19.16±5.97, and mean value of BLIMXT6 in class I group is 13.38±5.48, BLIMXT6 were significantly larger in Class II, division 1 group than Class I group ($P < .001$).

COMPARISON OF BUCCOLINGUAL INCLINATION OF MANDIBULAR PREMOLARS AND MOLAR BETWEEN CLASS II DIV 1 AND CLASS I

Buccolingualinclinationof mandibular first premolar (BLIMNT4) (Table-3, bar diagram -2) Mean value of BLIMNT4 in class II div 1 group is 17.33 ± 6.72, and mean value of BLIMNT4 in class I group is 16.12 ± 5.74, there are no significantdifference in BLIMNT4 betweenClass II division 1 group and Class I group ($P =.336$).

Buccolingualinclinationof mandibular 2nd premolar (BLIMNT5) (Table-3, bar diagram -2)- Mean value of BLIMNT5 in class II div 1 group is 21.17 ± 6.65, and mean value of BLIMNT5 in class I group is 19.33±5.97, there are no significantdifference in BLIMNT5 betweenClass II division 1 group and Class I group ($P =0.149$).

Buccolingualinclinationof mandibular 1st molar (BLIMNT6) (Table-3, bar diagram -2)- Mean value of BLIMNT6 in class II div 1 group is 30.61 ± 6.54, and mean value of BLIMNT6 in class I group is 27.31 ± 5.40, BLIMNT6 were significantly larger in Class II division 1 group than Class I group ($P < .007$).

COMPARISON OF ARCH WIDTH OF MAXILLARY PREMOLARS AND MOLAR BETWEEN CLASS II DIV 1 AND CLASS I

Archwidthofmaxillaryfirst premolar (ARWMX4) (Table-4, bar diagram -3)- Mean value of ARWMX4 in class II div 1 group is 44.28±2.55, mean value of ARWMX4 in class I group is 45.38±2.62. ARWMX4 were significantly smaller in Class II, division 1 group than Class I group ($P =.036$).

Archwidthofmaxillary 2nd premolar (ARWMX5) (Table-4, bar diagram -3)- Mean value of ARWMX5 in class II div 1 group is 49.09±3.00, mean value of ARWMX5 in class I group is 50.24±3.14. No significant differences were found between ARWMX5 of Class II division 1 group and Class I group ($P =0.066$).

Archwidthofmaxillaryfirst molar (ARWMX6) (Table-4, bar diagram-3) - mean value of ARWMX6 in class II div 1 group is 54.76±2.29, mean value of ARWMX6 in class I group is 56.61±3.30. ARWMX6 were significantly smaller in Class II division 1 group than Class I group ($P =0.004$).

COMPARISON OF ARCH WIDTH OF MANDIBULAR PREMOLARS AND MOLAR BETWEEN CLASS II DIV 1 AND CLASS I

Archwidthof mandibular first premolar (ARWMN4) (Table-5, bar diagram-4)- Mean value of ARWMN4 in class II div 1 group is 38.25±2.79, mean value of ARWMN4 in class I group is 39.35±4.10.there are no significant differences were found between ARWMN4 in Class II division 1 group and Class I group ($P =0.121$).

Archwidthof mandibular 2nd premolar (ARWMN5) (Table-5, bar diagram-4)- Mean value of ARWMN5 in class II div 1 group is 44.32±2.71, mean value of ARWMN5 in class I group is 43.97±3.17.there are no

significant differences were found between ARWMN5 in Class II division 1 group and Class I group (*P* =0.556).

Archwidthof mandibular first molar (ARWMN6) (Table-5, bar diagram -4)- Mean value of ARWMN6 in class II div 1 group is 50.79±2.79, mean value of ARWMN6 in class I group is 51.25±2.98.there are no significant differences were found between ARWMN6 in Class II division 1 group and Class I group (*P=0.426*).

COMPARISON OF ALVEOLAR WIDTH OF MAXILLARY PREMOLARS AND MOLAR BETWEEN CLASS II DIV 1 AND CLASS I
Alveolar widthofmaxillary 1st premolar (ALWMX4) (Table-6, bar diagram -5)- Mean value of ALWMX4 in class II div 1 group is 46.86±2.46, mean value of ALWMX4 in class I group is 47.45±2.79. No significant differences were found between ALWMX4 of Class II division 1 group and Class I group (*P*= 0.266).

Alveolar widthofmaxillary 2nd premolar (ALWMX5) (Table-6, bar diagram -5) - Mean value of ALWMX5 in class II div 1 group is 53.50±2.79, mean value of ALWMX5 in class I group is 53.62±2.99. No significant differences were found between ALWMX5 of Class II division 1 group and Class I group (*P* =0.836).

Alveolar widthofmaxillary 1st molar (ALWMX6) (Table-6, bar diagram -5) - Mean valueof ALWMX6 in class II div 1 group is 59.72±2.7, mean value of ALWMX6 in class I group is 60.49±3.23. No significant differences were found between ALWMX6 of Class II division 1 group and Class I group (*P* =0.200).

COMPARISON OF ALVEOLAR WIDTH OF MANDIBULAR PREMOLARS AND MOLAR BETWEEN CLASS II DIV 1 AND CLASS I
Alveolar widthof mandibular 1st premolar (ALWMN4) (Table-7, bar diagram -6) - Mean value of ALWMN4 in class II div 1 group is 39.03±2.84, mean value of ALWMN4 in class I group is 40.01±2.19. No significant differences were found between ALWMN4 of Class II division 1 group and Class I group (*P=0.056*).

Alveolar widthof mandibular 2nd premolar (ALWMN5) (Table-7, bar diagram -6) - Mean value of ALWMN5 in class II div 1 group is 47.43±2.49, mean value of ALWMN5 in class I group is 47.40±2.36. No significant differences were found between ALWMN5 of Class II division 1 group and Class I group (*P* < 0.944).

Alveolar widthof mandibular 1st molar (ALWMN6) (Table-7, bar diagram -6) - Mean value of ALWMN6 in class II div 1 group is 56.25±2.71, mean value of ALWMN6 in class I group is 56.11±2.61. No significant differences were found between ALWMN6 of Class II division 1 group and Class I group (*P* =0.797).

Table 1: Mean age and FMA angle ofthestudypopulation

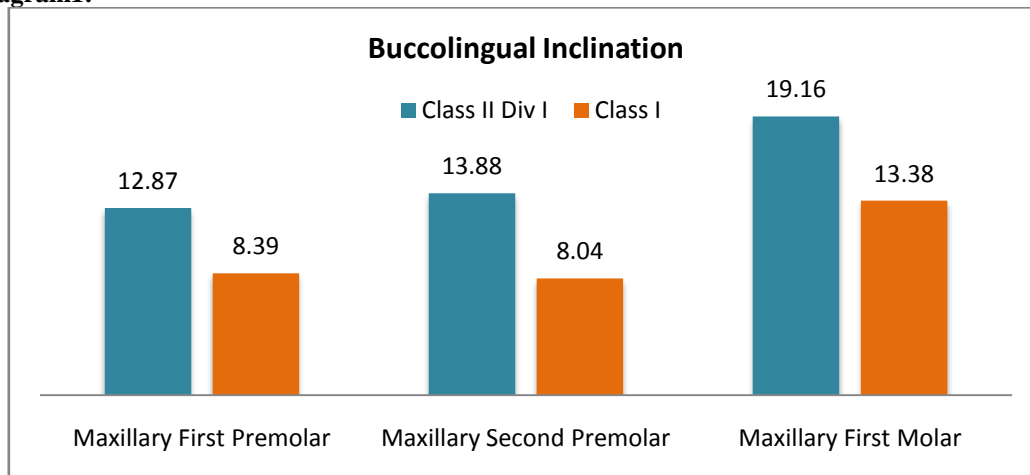| Variable	Groups	Mean	S.D.	Range
Age	Class II Div 1	18.85	2.14	16-23
	Class I	19.64	1.28	16-23
FMA Angle	Class II Div 1	24.04	2.46	22-28
	Class I	24.10	2.63	22-28

Bar diagram1:

Table 2: Comparisonof mean bucco-lingual inclinationofmaxillaryfirst premolar, second premolar and first molar betweenClass II Division I and Class I group

Variables	Groups	N	Mean	S.D.	M.D.	95% C.I.	t-Value	P-Value[*]
BLIMXT4	CL II Div I	50	12.87	6.20	4.48	2.15-6.80	3.828	<0.001[†]
	CL 1	50	8.39	5.47				
BLIMXT5	CL II Div I	50	13.88	5.73	5.84	3.61-8.06	5.209	<0.001[†]
	CL 1	50	8.04	5.47				
BLIMXT6	CL II Div I	50	19.16	5.97	5.78	3.50-8.05	5.041	<0.001[†]
	CL 1	50	13.38	5.48				

BLIMXT4, bucco-lingual inclinationofmaxillaryfirst premolar; BLIMXT5 - bucco-lingual inclinationofmaxillarysecond premolar, BLIMXT6, bucco-lingual inclinationofmaxillaryfirst molar
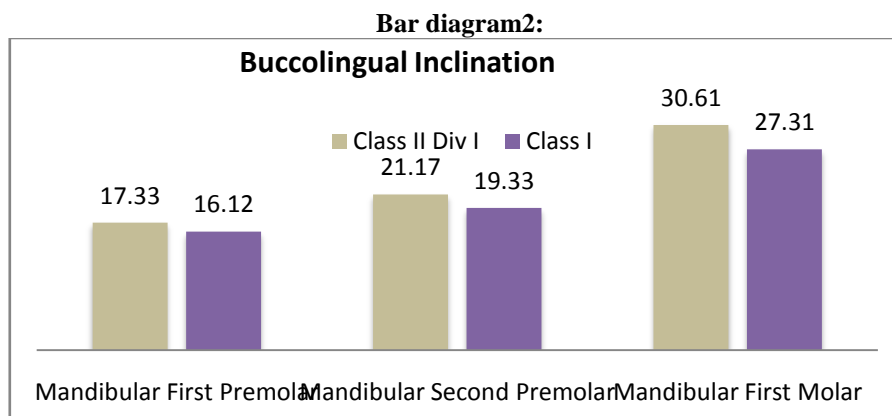[*]P-value derived from independent sample (un-paired) t-test; [†]significant at p <0.05

Bar diagram2:

Table 3: Comparisonof mean bucco-lingual inclinationofmandibularfirst premolar, second premolar and first molar betweenClass II Division I and Class I group

Variables	Groups	N	Mean	S.D.	M.D.	95% C.I.	t-Value	P-Value[*]
BLIMNT4	CL II Div I	50	17.33	6.72	1.21	-1.27-3.69	0.967	0.336
	CL 1	50	16.12	5.74				
BLIMNT5	CL II Div I	50	21.17	6.65	1.84	-0.66-4.34	1.455	0.149
	CL 1	50	19.33	5.97				
BLIMNT6	CL II Div I	50	30.61	6.54	3.30	0.91-5.68	2.748	0.007[†]
	CL 1	50	27.31	5.40				

BLIMNT4, bucco-lingual inclinationof mandibular first premolar; BLIMNT5 - bucco-lingual inclinationof mandibular second premolar, BLIMNT6, bucco-lingual inclinationof mandibular first molar
[*]P-value derived from independent sample (un-paired) t-test; [†]significant at p <0.05
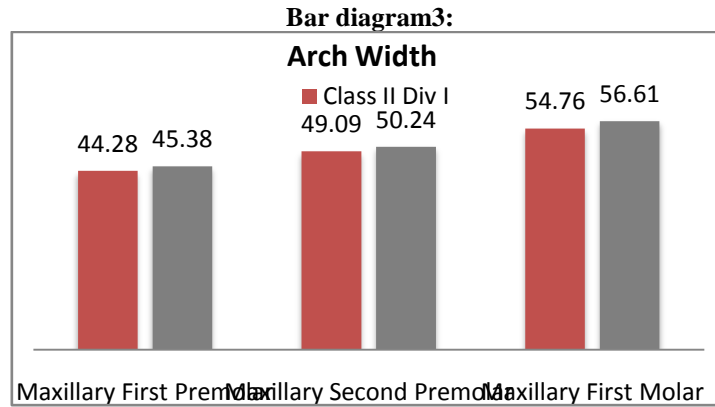
Bar diagram3:

Table 4: Comparisonof mean archwidthofmaxillaryfirst premolar, second premolar and first molar betweenClass II Division I and Class I group

Variables	Groups	N	Mean	S.D.	M.D.	95% C.I.	t-Value	P-Value[*]
ARWMX4	CL II Div I	50	44.28	2.55	-1.10	-2.1--0.73	-2.125	0.036[†]
	CL 1	50	45.38	2.62				
ARWMX5	CL II Div I	50	49.09	3.00	-1.14	-2.36-0.07	-1.860	0.066
	CL 1	50	50.24	3.14				
ARWMX6	CL II Div I	50	54.76	2.92	-1.85	-3.09--0.61	-2.965	0.004[†]
	CL 1	50	56.61	3.30				

ARWMX4, arch width of maxillary first premolar; ARWMX5, arch width of maxillary second premolar;ARWMX6, arch width of maxillary first molar
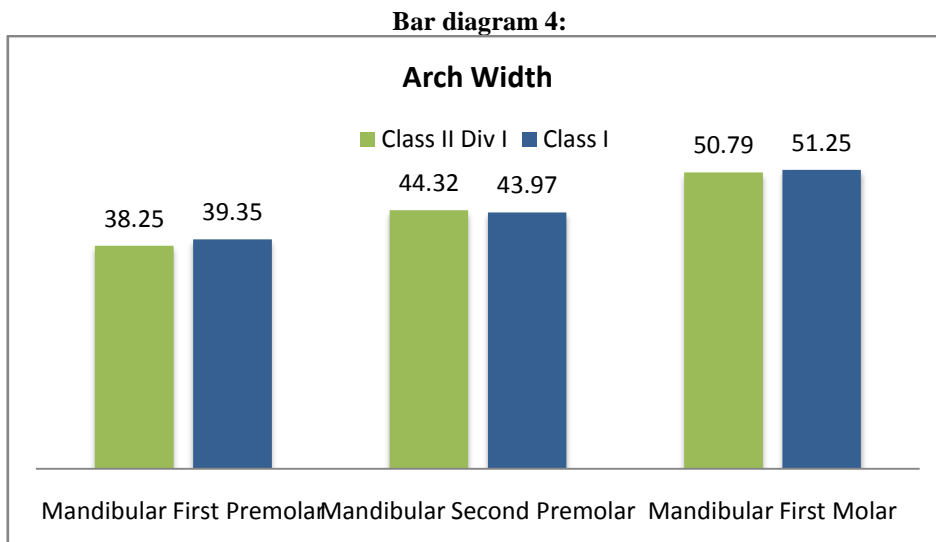[*]P-value derived from independent sample (un-paired) t-test; [†]significant at p <0.05

Bar diagram 4:

Table 5: Comparisonof mean archwidthof mandibular first premolar, second premolar and first molar betweenClass II Division I and Class I group

Variables	Groups	N	Mean	S.D.	M.D.	95% C.I.	t-Value	P-Value[*]
ARWMN4	CL II Div I	50	38.25	2.79	-1.09	-2.49-0.29	-1.562	0.121
	CL 1	50	39.35	4.10				
ARWMN5	CL II Div I	50	44.32	2.71	0.34	-0.82-1.52	0.591	0.556
	CL 1	50	43.97	3.17				
ARWMN6	CL II Div I	50	50.79	2.79	-0.46	-1.61-0.68	-0.800	0.426
	CL 1	50	51.25	2.98				

ARWMN4, arch width of mandibular first premolar; ARWMN5, arch width of mandibular second premolar; ARWMN6, arch width of mandibular first molar

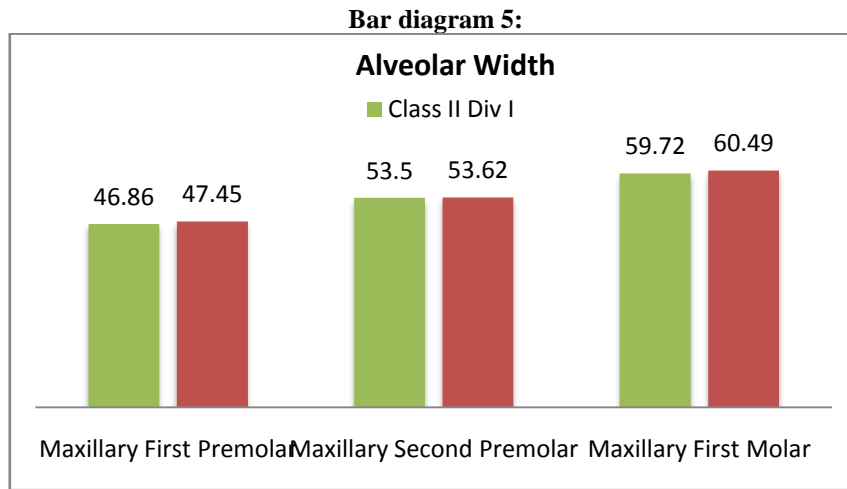[*]P-value derived from independent sample (un-paired) t-test.

Bar diagram 5:

Table 6: Comparisonof mean alveolar widthofmaxillaryfirst premolar, second premolar and first molar betweenClass II Division I and Class I group

Variables	Groups	N	Mean	S.D.	M.D.	95% C.I.	t-Value	P-Value[*]
ALWMX4	CL II Div I	50	46.86	2.46	-0.58	-1.63-0.45	-1.119	0.266
	CL 1	50	47.45	2.79				
ALWMX5	CL II Div I	50	53.50	2.79	-0.12	-1.26-1.02	-0.207	0.836
	CL 1	50	53.62	2.99				
ALWMX6	CL II Div I	50	59.72	2.71	-0.77	-1.95-0.41	-1.292	0.200
	CL 1	50	60.49	3.23				

ALWMN4, alveolar width of maxillary first premolar; ALWMN5, alveolar width of maxillary second premolar; ALWMN6, alveolar width of maxillary first molar

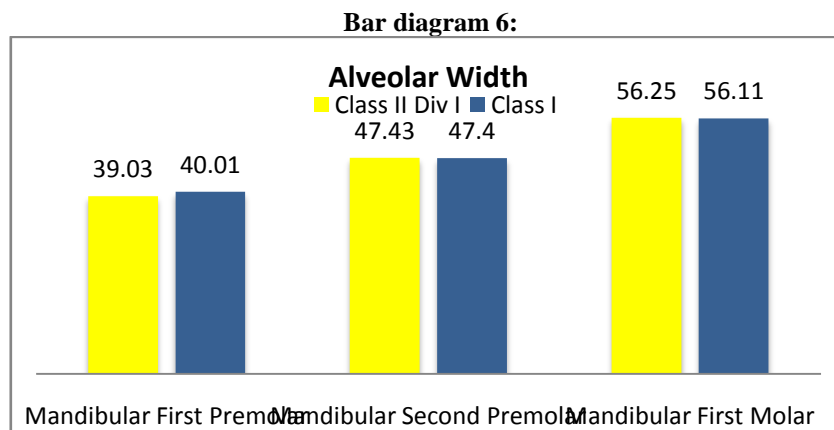[*]P-value derived from independent sample (un-paired) t-test.

Bar diagram 6:

Table 7: Comparisonof mean alveolar widthof mandibular first premolar, second premolar and first molar betweenClass II Division I and Class I group

Variables	Groups	N	Mean	S.D.	M.D.	95% C.I.	t-Value	P-Value[*]
ALWMN4	CL II Div I	50	39.03	2.84	-0.98	-1.99-0.02	-1.933	0.056
	CL 1	50	40.01	2.19				
ALWMN5	CL II Div I	50	47.43	2.49	0.03	-0.93-0.99	0.070	0.944

	CL 1	50	47.40	2.36				
ALWMN6	CL II Div I	50	56.25	2.71	0.13	-0.91-1.19	0.258	0.797
	CL 1	50	56.11	2.61				

ALWMN4, alveolar width of mandibular first premolar; ALWMN5, alveolar width of mandibular second premolar; ALWMN6, alveolar width of mandibular first molar
*P-value derived from independent sample (un-paired) t-test

IV.   Discussion

A thorough knowledge of the skeletal and dental components that contribute to a malocclusion is essential as these elements may influence the treatment approach. Andrew[1] suggested the use of anatomic references, with the object of centralizing the roots of teeth in the basal bone, which they denominated via the WALA (Will Andrew & Larry Andrew) Ridge. The WALA ridge[4] is strip of soft tissue immediately above mucogingival junction of the mandible, at the level of the line that passes through the center of the rotation of the teeth or close to it and is exclusive to the mandible. Therefore the center line of rotation (hypothetical line that passes through the horizontal center of rotation of each tooth) would be the line that best conserves the original and ideal form of the dental arch. Thus the ideal form of the maxillary and mandibular dental arches would be dictated by the the form of the basal bone of the mandible.

ANB angle is widely accepted diagnostic standard for sagittal jaw discrepancy and was employed in this research to divide the sample into skeletal Class I and Class II relationships.

Result of this study shows there no statistically significant difference of alveolar arch width between class II div 1 and class I occlusion in maxilla and mandibular arch in 1st premolar 2nd premolar and 1st molar region which was in contrary to the results of Uysal et al.[5], who found that the maxillary and mandibular alveolar widths was narrower in Class II division 1 and division 2 malocclusions than in normal occlusion . Their alveolar width measurement was taken between mucogingival junction landmarks in the maxilla and their projections for the mandible and this could be the reason of the differences between our results. Another important reason is the fact that the normal occlusion sample in Uysal et al. study included only subjects with minor or no crowding, whereas the absence of crowding was not a criterion in the Class II groups. If a Class I group with crowding would be compared with a Class I group without crowding, most probably narrower arches would be found in the Class I group with crowding. For that reason, group differences in their study may be the result of differences concerning crowding.

Staley et al.[3] compared untreated normal-occlusion subjects with Class II, Division 1 subjects , using mucogingival junction landmarks to measure the alveolar width . They found that maxillary alveolar width was narrower in subjects with malocclusion. These results not coincide with ours, again probably because of sample selection and method of measuring along with the fact that Staley et al had not mentioned about posterior crossbite in the Class II group. In selecting the subjects, we took into consideration that no posterior crossbites were present. This may be an important factor that can affect the results if Class I patients had no crossbites and some of the Class II patients had crossbites . Class I patients who have well aligned arches may have posterior crossbites too. If posterior crossbites would not have been taken into consideration in both Class I and Class II subjects, then the results may be affected by other factors and need further investigations.

A study by Abdul Mueez et al[6] also give similar results. Results of this study also shows that arch width of maxillary 1st premolar and 1st molar are statistically smaller in class II div 1 group than class I group but there is no statistically significant difference of arch width of maxillary 2nd premolar and mandibular 1st and 2nd premolar and 1st molar region. This is supported by many studies done earlier.

According to Bishara et al.[7] there is a relative constriction of the maxillary intermolar width in the subjects with Class II, Division 1 malocclusions. Tollaro et al.[8] also give the samilar results. These finding are same as our study.

Buccolingual tooth inclination is one of Andrew's Six Keys to Normal Occlusion[1].In our study we found that buccolingual inclination played a major role in class II div 1.

Abdul Mueez et al[6] concluded Buccolingual inclination in maxillary posterior teeth are significantly tilted more in class II than in class I occlusion. It's been attributed by clinicians that low tongue position, abnormal swallowing and sucking behaviours, nasal obstruction, finger habits & tongue thrusting were reasons for narrower maxillary dental arch widths in Class II division 1 malocclusions compared with a normal class I occlusion samples.

The present results showed that mandibular first molar inclination in subjects with class II molar (n = 50) was significantly more than those with class I molar (n = 50). This may be a dental compensation to maxillary transverse deficiency which is typical in Class II malocclusion. McNamara[7] has suggested that the position of the lower teeth may depend more on maxillary morphology than mandibular morphology. Of all Class II subjects, 82% did not have a posterior crossbite. This suggests that the absence of a crossbite does not

necessarily mean that the maxilla is of normal width, because dental compensations may mask the skeletal discrepancy.

Shortcoming of this study:
1. The reliability of measurements in the 3D method was higher than that with the TIP(Tooth inclination protractor) device. 3D method was not used in our study to reduced expenses and to avoid unnecessary radiation exposure.
2. Male and female subjects were, however, not put in separate groups in this study. Equal number of male and female subject were taken.
3.Further studies are suggested with a larger sample, with separated male and female study groups using CT scans in different skeletal pattern.

V.   Conclusion

From the summery it can be concluded that there is no skeletal transverse discrepancies in maxillary and mandibular arch in premolars and molar region between class II div 1 group and class I group. Maxillary arch width is narrower and maxillary posterior teeth are more palatally tilted in class II div 1 group. Mandibular 1st molar are more lingually inclined in class II div 1 to compensate narrow maxillary arch in class II div 1. Means transverse discrepancies in class II div 1 is a dental problem not a skeletal problem. In keeping with the finding of this study it can be inferred that slow maxillary expansion are more indicated than rapid maxillary expansion in class II div 1 patient.

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