ORIGINAL ARTICLE

COMPARATIVE CROSS-SECTIONAL STUDY OF BUCCOLINGUAL INCLINATION OF PERMANENT FIRST MOLAR IN DIFFERENT VERTICAL FACIAL PATTERNS IN A SAMPLE OF PAKISTANI POPULATION

Mazhar Hussain✉, Faiza Malik, Muhammad Noman, Alamgir*, Hooria Haq, Fiza Khan

Sharif Medical and Dental College, Lahore-Pakistan
***Ayub Medical College, Abbottabad-Pakistan**

Background: Appropriate buccolingual inclination of posterior teeth and most favorable transverse width of maxillary arch are necessary to improve smile esthetics. The variability of buccolingual molar inclination in orthodontic literature, mainly in relation to vertical growth pattern of the face (Hyperdivergent, Normodivergent and Hypodivergent) is challenging for the orthodontist in choosing the treatment approach for addressing the problem in specific patients. Hence, the focus of this research was comparative assessment of buccolingual molar inclination in various vertical facial growth patterns. **Methods:** After obtaining ethical approval and informed consent, pre-treatment lateral cephalograms were taken to analyze vertical and sagittal craniofacial characteristics of orthodontic patients at Sharif Medical and Dental College, Lahore. The inclination of permanent first molars was measured on dental casts of orthodontic patients, by marking a perpendicular line to the occlusal table of the first molar and a perpendicular line from the base of the cast. The angle formed between these lines was measured by protractor for all quadrants. **Results:** Seventy-five orthodontic patients were included in this cross-sectional study, where 44% were male and 56% were female. The frequency of normodivergent patients was 34.6%, hypodivergent was 34.6% and hyperdivergent was 30.6%. There was an insignificant gender difference in terms of buccolingual inclination of molars by applying independent t-test. The comparison of the inter-study group (three groups) means of continuous variables was carried out with analysis of variance (ANOVA). There was a significant difference in intergroup comparison based on Levene statistics (p<0.05). The statistical difference for buccolingual inclination of maxillary and mandibular first molar between groups based on Levene statistics and F value was significant (p=0.000 for all). Multiple comparison by Games-Howell Post-Hoc test was done for intergroup comparison after verifying significant difference by Levene statistic (p<0.05). **Conclusion:** In vertical growth pattern, the first molar teeth have a higher buccal inclination relative to horizontal or normal growth pattern. There was insignificant statistical difference between both genders in terms of buccolingual molar inclination.

Keywords: Molar; Inclination; Torque; Maxillofacial development; Lateral Cephalogram

Citation: Hussain M, Malik F, Noman M, Alamgir, Haq H, Khan F. Comparative cross-sectional study of buccolingual inclination of permanent first molar in different vertical facial patterns in a sample of Pakistani population. J Ayub Med Coll Abbottabad 2025;37(1):114–9.

DOI: 10.55519/JAMC-01-13437

INTRODUCTION

Improving smile esthetics is a major motive for patients seeking orthodontic care and it is given top priority during orthodontic treatment planning, in addition to function and stability.[1] A major goal of smile esthetics is to ensure filling of buccal corridors.[2] The term buccal corridors was defined for the first time in 1958 as the spaces between posterior buccal surfaces of teeth and the corners of the mouth during smiling.[3] Optimal buccolingual inclination of posterior teeth and an appropriate transverse dimension of maxillary arch is essential to reach this goal.[4,5]

Buccolingual inclination of molar is also known as crown inclination of the molar in the buccolingual or transverse plane. On a dental cast it is represented by an angle formed between the axis of clinical crown of tooth and a perpendicular line to the dental cast base, which is trimmed parallel to the posterior occlusal plane.[6] Buccolingual inclination of teeth is an appealing area of interest for orthodontists since long. According to Andrew's six keys of normal occlusion, the teeth's buccolingual inclination is an integral part of normal occlusion and constitutes an important finishing criterion of an orthodontic case by American Board of Orthodontists (ABO).[7,8] The torque prescription of posterior brackets and third order bends

in arch wire are important in achieving these goals. Therefore, for selection of proper prescription of Straight Wire Appliance, the buccolingual inclination is a fundamental parameter to be considered.

Literature review has shown different results about the buccolingual inclination of molars and premolars relative to vertical facial proportions. It is suggested that patients having increased anterior face height develop higher buccal inclination and longer functional (lingual) cusps. In contrast, patients with decreased anterior face height have more lingual inclination and longer buccal cusps in posterior teeth.[9] Ross *et al* reported insignificant difference in buccolingual inclination of molars teeth among various facial types, while most others found significant differences between them.[10]

Various studies have also found that hyperdivergent maxillomandibular patterns have narrower maxillary arch width with high palate and tendency for palatal crossbite, while patients with hypodivergent maxillomandibular patterns have broader maxillary arches and wide palate with affinity for buccal crossbite.[11,12]

The variability of buccolingual molar inclination reported in orthodontic literature, mainly in relation to vertical facial parameters, makes it challenging for the orthodontist in finalizing the treatment approach for addressing the malocclusion in specific patients. Therefore, the objective of the current research was to compare the buccolingual inclination of permanent first molars in different vertical facial patterns in a sample of orthodontic patients from the Pakistani population. The study will help to quantify these inclinations using dental casts for inclination of molar teeth and cephalometric analysis for vertical facial types. Furthermore, it will suggest guidelines for molar inclination in various vertical facial patterns, which are vital for diagnosis and treatment planning in orthodontics, as well as selecting the best mechanotherapy.

MATERIAL AND METHODS

This cross-sectional study was done at the Department of Orthodontics, Sharif Medical and Dental College Lahore, after taking ethical approval from Sharif Medical Research Center and Ethics Committee. The inclusion criteria was untreated orthodontic patients aged 13 years and above, irrespective of gender, with complete permanent dentition and Class I skeletal pattern. The exclusion criteria was impacted, malformed, missing or ectopically erupted permanent first molar, and history of previous orthodontic treatment. Written informed consent was taken from every patient prior to making the study casts and taking lateral cephalometric radiographs.

Using non-probability consecutive sampling technique, 75 orthodontic patients were selected with the help of WHO sample size determination software by comparison of mean of upper right molar inclination (group 1: 8.0±3.7 and group 2: 6.4±3.6) with level of significance 5% and power of study 90%.[13] Pre-treatment lateral cephalograms were obtained and cephalometric analysis was performed to determine vertical and sagittal skeletal characteristics of all patients.

Sagittal skeletal pattern, defined as follows, was a confounding variable, therefore, only normal (Class I) sagittal maxillomandibular relation was included:

1. Class I: ANB angle 0-4^0
2. Class II: ANB angle >4^0
1. Class III: ANB angle <0^0

SN-MP angle was measured on lateral cephalogram to reveal the vertical facial pattern (normal value being 32^o ± 4^o).[14] Three different groups were formed on the basis of vertical facial pattern as follows:

2. Hypodivergent: SN/MP angle <27^0
3. Normodivergent: SN/MP angle 27^0 to 37^0
4. Hyperdivergent: SN/MP angle >37^0

The patients' dental casts were made after taking Alginate (Cavex CA37) impression and poured with Die Stone plaster (KOPO-Hard CKH-52). The posterior occlusal plane (POP) was delineated by a rectangular histological glass slide (1×3") contacting at least 3 points while seating: 1 at each mandibular molar's most prominent cusp bilaterally, 1 or 2 at any second premolar's most prominent cusp (Figure-1).[10]

The trimming of the base of the casts was done parallel to the POP. The study cast was then split into right and left sections via mid-palatal raphe (maxillary) and lingual frenum (mandible) as shown in Figure-2. Each half was trimmed from the distal portion perpendicularly to the base up to the line A and B passing through mesiolingual and mesiobuccal cusp of first molar.

Two perpendicular lines were drawn from occlusal plane (OP) of first molars and base of the cast. The angle made by these two lines (θ) at their point of intersection was measured by a protractor. Inclination was positive if the molar was buccally inclined and termed negative if it was lingually inclined (Figure-3).

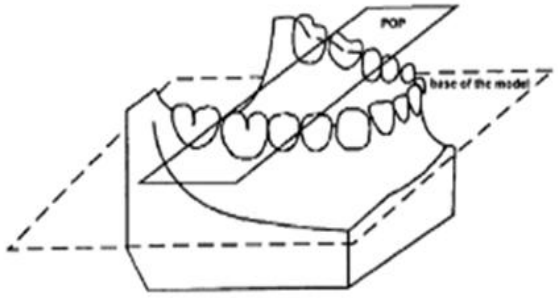

Figure-1: Determination of posterior occlusal plane in dental cast

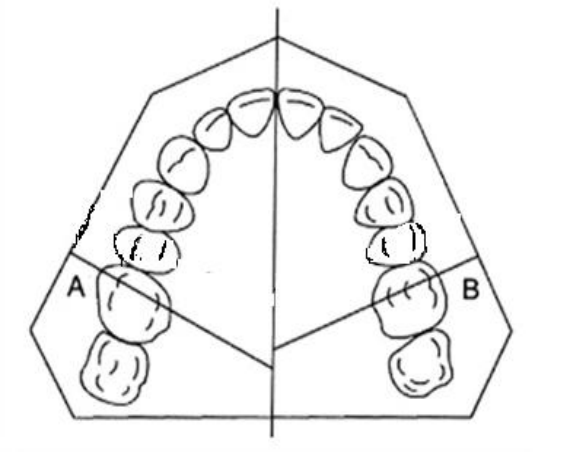

Figure-2: Sectioning of dental cast

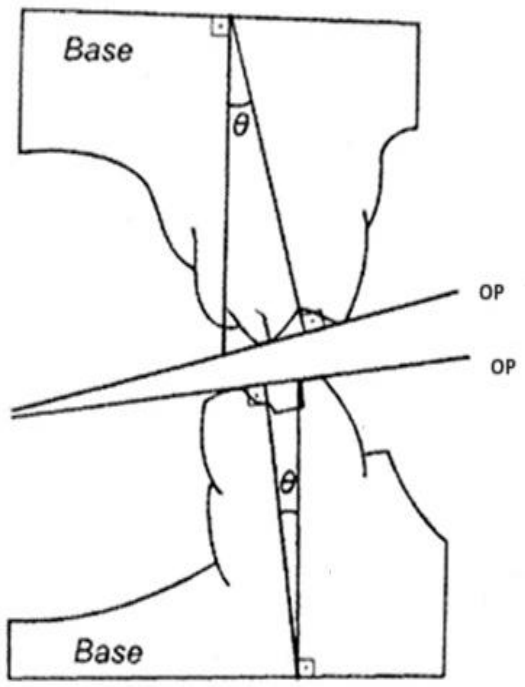

Figure-3: Measurement of buccolingual inclination of molar

Data analysis was done using IBM SPSS version 25. Quantitative variables like age and buccolingual inclination of first molar in all four quadrants of the oral cavity, were presented as mean and standard deviation (SD). Qualitative variables like vertical facial pattern and gender were presented as frequency and percentage. One way ANOVA was applied to determine the significance of difference in buccolingual inclination of first molars in three vertical facial patterns. A *p*-value less than 0.05 was considered to be significant. Levene statistic and Games-Howell Post-Hoc test was used for intergroup comparison. Gender dimorphism was studied for buccolingual inclination of molar and t-test was applied to reveal the significance.

RESULTS

Out of 75 patients, 33 (44%) were male and 42 (56%) were female. The mean age was 17±3.3 years. The frequency of normodivergent patients was 26 (34.6%), hypodivergent was 26 (34.6%) and hyperdivergent group was 23 (30.6%).

The difference in buccolingual molar inclinations between both genders was statistically insignificant, assuming equal variance by applying independent t-test (Table-1).

The inter-study group (three groups) statistical comparison of means of continuous variable was done using ANOVA. Table-2 shows the mean and SD of buccolingual inclination of maxillary and mandibular first molar for all three groups. Mandibular molars in hypodivergent group showed lingual inclination of crowns. Furthermore, mandibular molars were lingually inclined in contrast to the buccal inclination of maxillary molars. There was significant statistical difference in intergroup comparison based on Levene statistics ($p<0.05$). There was significant statistical difference for buccolingual inclination of maxillary and mandibular first molar between groups based on Levene statistics and F value ($p=0.000$ for all).

Multiple comparison by Games-Howell Post-Hoc test (table 3) was done for intergroup comparison after verifying significant difference by Levene statistic ($p<0.05$).

Intergroup comparison of mean buccolingual inclination of upper molars: The mean difference of buccolingual inclination for upper first molars between normodivergent-hyperdivergent group and between hypodivergent –hyperdivergent group was statistically significant ($p<0.05$) while mean difference between normodivergent-hypodivergent group was statistically insignificant ($p>0.05$)

Intergroup comparison of mean buccolingual inclination of lower molars: The mean difference of buccolingual inclination for lower first molars between normodivergent-hypodivergent group and between hypodivergent –hyperdivergent group was statistically significant ($p<0.05$) while mean difference between normodivergent-hyperdivergent group was statistically insignificant ($p>0.05$)

Table 1: Buccolingual inclination of first molars with respect to gende

Group Statistics					
Buccolingual inclination	**Gender**	**N**	**Mean**	**Std. Deviation**	**Sig (2 tailed)**
UR6	Male	33	7.18	4.667	.415
	Female	42	8.02	4.205	
UL6	Male	33	7.18	4.838	.212
	Female	42	8.76	5.792	
LR6	Male	33	4.12	8.177	.457
	Female	42	2.64	8.731	
LL6	Male	33	3.85	7.357	.381
	Female	42	2.21	8.418	

*p<0.05 is significant

Table 2: Buccolingual inclination of first molars among different vertical facial patterns

Buccolingual inclination	**Vertical Pattern**	**N**	**Mean**	**SD**	**Levene statistics based on mean**	**Sig**	**F value between groups**	**Sig**
UR6	Normodivergent	26	26.08	2.883	4.559	.014*	26.381	.000*
	Hypodivergent	26	5.46	2.302				
	Hyperdivergent	23	11.91	4.709				
	Total	75	7.65	4.404				
UL6	Normodivergent	26	5.54	2.437	20.015	.000*	23.392	.000*
	Hypodivergent	26	6.12	2.833				
	Hyperdivergent	23	13.13	6.628				
	Total	75	8.07	5.416				
LR6	Normodivergent	26	4.77	6.153	4.958	.010*	19.494	.000*
	Hypodivergent	26	-3.15	8.269				
	Hyperdivergent	23	8.91	5.977				
	Total	75	3.29	8.467				
LL6	Normodivergent	26	4.00	5.418	6.057	.004*	20.688	.000*
	Hypodivergent	26	-3.12	7.871				
	Hyperdivergent	23	8.57	5.615				
	Total	75	2.93	7.958				

*p<0.05 is significant

Table-3: Multiple comparison of buccolingual inclination of all first molars in three vertical facial patterns by Games-Howell Post-Hoc test

Dependent Variable (Buccolingual inclination)	**Vertical facial pattern (I)**	**Vertical facial pattern (J)**	**Mean difference (I-J)**	**Std Error**	**Sig**
UR6	normodivergent	Hypodivergent	.615	.724	.674
		Hyperdivergent	-5.836	1.133	.000*
	hypodivergent	Normodivergent	-.615	.724	.674
		Hyperdivergent	-6.452	1.081	.000*
	hyperdivergent	Normodivergent	5.836	1.133	.000*
		Hypodivergent	6.452	1.081	.000*
UL6	normodivergent	Hypodivergent	-.577	.733	.713
		Hyperdivergent	-7.592	1.462	.000*
	hypodivergent	Normodivergent	.577	.733	.713
		Hyperdivergent	-7.015	1.490	.000*
	hyperdivergent	Normodivergent	7.592	1.462	.000*
		Hypodivergent	7.015	1.490	.000*
LR6	normodivergent	Hypodivergent	7.923	2.021	.001*
		Hyperdivergent	-4.144	1.735	.054
	hypodivergent	Normodivergent	-7.923	2.021	.001*
		Hyperdivergent	-12.067	2.045	.000*
	hyperdivergent	Normodivergent	4.144	1.735	.054
		Hypodivergent	12.067	2.045	.000*
LL6	normodivergent	Hypodivergent	7.115	1.874	.001*
		Hyperdivergent	-4.565	1.581	.016*
	hypodivergent	Normodivergent	-7.115	1.874	.001*
		Hyperdivergent	-11.681	1.937	.000*
	hyperdivergent	Normodivergent	4.565	1.581	.016*
		Hypodivergent	11.681	1.937	.000*

*p<0.05 is significant

DISCUSSION

Wilson first described the buccolingual inclination of posterior teeth, with lower teeth being lingually inclined and upper teeth buccally inclined, forming the Curve of Wilson.[15] This inclination is crucial for both esthetics and function in orthodontic smile design.[16] Long-term orthodontic stability depends on the correct root positioning of teeth, and appliances like the Edgewise bracket and Straight Wire Appliance help control this inclination. Proper understanding of buccolingual inclination allows orthodontists to select appropriate bracket prescriptions based on facial patterns. Various genetic and environmental factors influence dentofacial characteristics, and while many studies have examined buccolingual inclinations in different facial growth patterns, the findings remain inconsistent. This research aims to clarify the relationship between molar inclination and vertical facial growth patterns.

This study's findings indicate that vertical growth patterns significantly influence molar inclination, with hyperdivergent individuals showing increased buccal inclination of first molars as a compensatory mechanism for skeletal imbalances, while hypodivergent individuals exhibit more lingual inclination to accommodate a reduced vertical dimension. Statistical analysis using one-way ANOVA confirmed significant variance in molar inclination among different vertical growth patterns.[17,18] This emphasizes the importance of considering vertical dimensions in orthodontic diagnosis and treatment planning, as it impacts tooth positioning and long-term stability. Tailored treatment approaches, particularly in controlling molar torque, may be necessary to achieve optimal outcomes in cases involving skeletal malocclusions.

According to Ross *et al* and Grosso *et al*, there was insignificant difference in buccolingual molar inclination in different facial patterns.[10,19] Notably, Ross *et al* compared the inclination of molar teeth in three vertical patterns using pre-treatment casts for measurement, regardless of sagittal skeletal relationship. Grosso *et al* employed another technique, by measuring the long axis and inclinations of facial surface of the maxillary first molars, in relation to the occlusal plane, using cone beam computed tomography (CBCT) in three vertical types; thus, displaying comparable inclinations across different facial patterns.

Janson *et al* revealed higher value of buccal inclination of maxillary molar in hyperdivergent than the hypodivergent group.[20] Their hyperdivergent group consisted of both Class I and Class II division 1 patients and hypodivergent group consisted of Class II division 2 patients. Due to evidence regarding difference in the maxillary molar teeth inclination between Class I and Class II patients, the results of Janson's study are debatable.[21]

A study done on Asian Indian males using CT scans, showed comparable results, whereby there was a lingual inclination of 10.18±4.8° between the long axis of tooth and bone.[22] Berrera *et al* found buccal inclination of 4.05° in maxillary molars, while Al-Khatib and Chung reported 4.85±4.22° buccal inclination of maxillary molars and 12.60±5.29° lingual inclination of mandibular molars.[23,24] The current study also supports these findings, with buccal inclination of 7.78° in maxillary molars and 3.98° lingual inclination of mandibular molars.

Tsunori *et al* associated the faciolingual inclination of molars and different vertical facial patterns, and deduced that brachyfacial subjects have higher lingual inclination of mandibular molars.[11] Ashfaq and Fida measured first molar inclination using CBCT in adult subjects from Karachi, Pakistan and found that mandibular first molars were lingually inclined with mean value of 14.07±4.49° while maxillary molars were buccally inclined over the basal bone with a mean value of 9.42±6.70°.[25] Both these studies displayed similar trend to the current research.

Another study from Karachi, Pakistan was conducted by Khan to determine the relation of facial growth pattern with molars axial inclination and concluded that there is strong relation between molar mesiodistal inclination and facial growth pattern. The researcher found that mesiodistal angle of molar increased in hyperdivergent patients and was relatively upright in hypodivergent patients.[26] Although, mesiodistal molar inclination is beyond the scope of the current study, nevertheless, it highlights the significance of considering treatment choices according to three-dimensional molar inclination in all quadrants.

All of the above studies confirmed the association of buccolingual inclination of molars with vertical growth of the face. The expected variation in buccolingual molar inclination among different vertical growth patterns of the face, necessitates its consideration during treatment planning for better outcome in terms of stability, function and esthetics. The results of this study support the hypothesis suggested in literature that vertical facial growth pattern coincides with higher buccal inclination of posterior teeth, whereas, subjects having horizontal growth pattern have higher lingual inclination.[20]

The current study has inevitably yielded meaningful results, however, further studies with larger sample sizes are warranted to confirm whether the observed differences approach true clinical significance or not. Volumetric Imaging can be adopted for the said purpose, however, radiation exposure for the sole purpose of research may defy ethical principles. Future research should also consider factors such as the potential influence of compensatory mechanisms, typical and atypical facial growth patterns, soft tissue dynamics, and

individual variations in occlusal function. Further studies performed on adults, considering both sagittal and vertical characteristics separately, may provide a healthier and more conclusive outcome regarding the corrective measures to be taken for normodivergent, hypodivergent and hyperdivergent class I, class II and class III subjects.

CONCLUSION

The first molar teeth in both maxilla and mandible, in vertical facial growth pattern have a significantly higher buccal inclination as compared to those having horizontal or normal growth pattern. The horizontal facial growth pattern has greater lingual inclination of the molars than the other two groups. There was no significant difference between both genders in terms of buccolingual molar inclination.

AUTHORS' CONTRIBUTION

MH, FM, MN: Concept, literature search, write-up, proof reading. A, HH, FK: Data collection, analysis, interpretation.

REFERENCES

1. Christou T, Betlej A, Aswad N, Ogdon D, Kau CH. Clinical effectiveness of orthodontic treatment on smile esthetics: a systematic review. Clin Cosmet Investig Dent 2019;11:89–101.
2. Pisulkar SK, Agrawal R, Belkhode V, Nimonkar S, Borle A, Godbole SR. Perception of buccal corridor space on smile aesthetics among specialty dentist and layperson. J Int Soc Prev Community Dent. 2019;9(5):499–504.
3. Frush JP, Fisher RD. The dynesthetic interpretation of the dentogenic concept. J Prosthet Dent 1958;8(4):558–81.
4. Yang B, Chung CH. Buccolingual inclination of molars in untreated children and adults: A cone beam computed tomography study. Angle Orthod 2019;89(1):87–92.
5. Creekmore TD, Kunik RL. Straight wire: the next generation. Am J Orthod Dentofacial Orthop 1993;104(1):8–20.
6. Nouri M, Abdi AH, Farzan A, Mokhtarpour A, Baghban AA. Measurement of the buccolingual inclination of teeth: Manual technique vs 3-dimensional software. Am J Orthod Dentofacial Orthop 2014;146(4):522–9.
7. Andrews LF. Six keys to normal occlusion. Am J Orthod 1972;62(3):296–309.
8. Kantharaju VH, Shivaprakash G, Shamnur N. The relationship between posttreatment smile esthetics and the ABO objective grading system: class I extraction versus non-extraction cases. Turk J Orthod 2021;34(1):39–45.
9. Beugre-Kouassi AM, Koffi BE, Beugre JB. Dental inclination and thickness of the alveolar bone around incisors and molars according to the vertical facial type. Orthod J Nepal 2020;10(1):27–31.
10. Ross VA, Isaacson RJ, Germane N, Rubenstein LK. Influence of vertical growth pattern on faciolingual inclinations and treatment mechanics. Am J Orthod Dentofacial Orthop 1990;98(5):422–9. [10&13 are Duplicates]
11. Tsunori M, Mashita M, Kasai K. Relationship between facial types and tooth and bone characteristics of the mandible obtained by CT scanning. Angle Orthod 1998;68(6):557–62.
12. Isaacson JR, Isaacson RJ, Speidel TM, Worms FW. Extreme variation in vertical facial growth and associated variation in skeletal and dental relations. Angle Orthod 1971;41(3):219–29.
13. Ross VA, Isaacson RJ, Germane N, Rubenstein LK. Influence of vertical growth pattern on faciolingual inclinations and treatment mechanics. Am J Orthod Dentofacial Orthop 1990;98(5):422–9. [10&13 are Duplicates]
14. Hwang S, Jeong S, Choi YJ, Chung CJ, Lee HS, Kim KH. Three-dimensional evaluation of dentofacial transverse widths of adults with various vertical facial patterns. Am J Orthod Dentofacial Orthop 2018;153(5):692–700.
15. Goh S, Dreyer C, Weir T. The predictability of the mandibular curve of Wilson, buccolingual crown inclination, and transverse expansion expression with Invisalign treatment. Am J Orthod Dentofacial Orthop 2023;163(1):109–16.
16. Sezici YL, Önçağ MG. Conventional and self-ligating lingual orthodontic treatment outcomes in Class I nonextraction patients: A comparative study with the American Board of Orthodontics Objective Grading System. Am J Orthod Dentofacial Orthop 2023;163(4):e106–14.
17. Shu R, Han X, Wang Y, Xu H, Ai D, Wang L, *et al*. Comparison of arch width, alveolar width and buccolingual inclination of teeth between Class II division 1 malocclusion and Class I occlusion. Angle Orthod 2013;83(2):246–52.
18. Ahn J, Kim SJ, Lee JY, Chung CJ, Kim KH. Transverse dental compensation in relation to sagittal and transverse skeletal discrepancies in skeletal Class III patients. Am J Orthod Dentofacial Orthop 2017;151(1):148–56.
19. Grosso LE, Rutledge M, Rinchuse DJ, Smith D, Zullo T. Buccolingual inclinations of maxillary and mandibular first molars in relation to facial pattern. Orthod Pract 2012;5(2):43–8.
20. Janson G, Bombonatti R, Cruz KS, Hassunuma CY, Del Santo Jr M. Buccolingual inclinations of posterior teeth in subjects with different facial patterns. Am J Orthod Dentofacial Orthop 2004;125(3):316–22.
21. Golshah A, Rezaei N, Heshmati S. Buccolingual inclination of canine and first and second molar teeth and the curve of Wilson in different sagittal skeletal patterns of adults using cone-beam computed tomography. Int J Dent 2020;2020:8893778.
22. Kohakura S, Kasai K, Ohno I, Kanazawa E. Relationship between maxillofacial morphology and morphological characteristics of vertical sections of the mandible obtained by CT scanning. J Nihon Univ Sch Dent 1997;39:71–7.
23. Barrera JM, Llamas JM, Espinar E, Saenz-Ramirez C, Paredes V, Perez Varela JC. Wilson maxillary curve analyzed by CBCT: A study on normocclusion and malocclusion individuals. Med Oral Patol Oral Cir Bucal 2013;18:e547.
24. Alkhatib R, Chung CH. Buccolingual inclination of first molars in untreated adults: a CBCT study. Angle Orthod 2017;87:598–602.
25. Ashfaq M, Fida M, Fatima F. CBCT based assessment of first molar inclination in adult subjects. J Pak Dent Assoc 2023;32(1):4–7.
26. Khan EB, Mottani DA, Kumar S, Bibi A, Kumari H, Khan S. Relation of facial growth pattern with molar's axial inclination. J Liaquat Univ Med Health Sci 2021;20(3):209–13.

Submitted: May 30, 2024	*Revised: October 4, 2024*	*Accepted: December26, 2024*

Address for Correspondence:

Mazhar Hussain, Sharif Medical and Dental College, Lahore-Pakistan
Cell: +92 346 899 9293
Email: drsami6693@yahoo.com