

Prevalence of asymmetric molar relationship in orthodontic patients

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Abstract

Introduction: Orthodontic treatment aims at attainment of ideal occlusion. With the soft tissue paradigm shift, more stress is placed on achievement of balanced facial proportions and occlusal goals become secondary. Albeit these changes, achievement of optimal functional occlusion remains the mainstay of stability. Hence the aim of this study was to find out the prevalence of asymmetry between right and left molar relationship.

Material and Methods: Data was obtained from study casts of 105 patients reporting to Orthodontic Department, Rawal Institute of Health Sciences, Islamabad. These patients were to undergo fixed appliance treatment. Molar relationship was recorded from both sides of the study casts in centric occlusion. Statistical analysis and chi-square tests were applied using SPSS 21 to find out significance.

Results: 39% patients had asymmetric molar relationship while 61% patients had symmetric molar relationship. Half cusp asymmetry was found in 7.6% of the sample and full cusp asymmetry was found in 10.4 % of the patients with asymmetry.

Conclusions: Asymmetric molar relationship is found in Orthodontic patients which expresses mostly in the form of full cup relationship rather than being equivalent to half cusp molar relationship.

Keywords: Asymmetry; molar relationship; angle classification

Introduction

Attractive faces have symmetry between the right and left halves. Ideal occlusion is dependent on stable and balanced occlusion and is always associated with symmetric molar and canine relationship as well as normal overjet, overbite and coincident midlines. Asymmetry in molar relationship can result from multiple factors which include presence of supernumerary teeth, ectopic eruptions, space loss due to

premature loss of primary teeth or interproximal caries and congenitally missing teeth.¹⁻⁵

Diagnosis and treatment planning of orthodontic cases with asymmetric molar relationship is always challenging.⁶⁻⁸ Presence of asymmetric molar relationship makes orthodontic treatment difficult as different types of mechanics are required to achieve desired post treatment molar relationship which can be either class I, II or III. Purpose of the present study was to assess the prevalence of asymmetry between right and left molar relationship in a Pakistani population so that it could help in diagnosis and treatment planning. Moreover, planning of mechanics for such cases can be addressed more efficiently.

Material and Methods

This was a cross-sectional comparative study conducted at the Orthodontic department,

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Rawal Institute of Health Sciences, Islamabad. Data was collected from the study casts and intra-oral photographs of 105 patients planned for fixed Orthodontic appliances within a year. Patients more than 12 years of age having all permanent teeth excluding 3rd molars were included in the sample. Patients who had received orthodontic treatment or prosthetic/restorative treatment in the past that altered their molar relationship, who had facial asymmetry or had a history of facial trauma, were excluded from the study sample.

Molar relationship was recorded from the study casts maximum intercuspation with the bite record in place. These were classified on the basis of Angle's molar classification (Class I, II and III).⁹⁻¹¹ Class II molar relationship was further subdivided into 1/4 cusp class II, 1/2 cusp class II, 3/4 cusp class II and full cusp class II molar relationship. Class III molar relationship was divided into half cusp and full cusp class III molar relationship.¹² Molar relationship asymmetry equivalent to half cusp (Class I on one side and class II 1/2 cusp or class III 1/2 on the other) and the asymmetry equivalent to full cusp (Class I on one side and full cusp class II or class III on other side) was also noted. SPSS 21 was used for statistical analysis. Descriptive statistics for variables like molar relationships and asymmetry in molar relationship were presented as frequency and percentages. Chi-square test was applied for statistical interference. The level of significance test was set $p < 0.05$.

Results

Results showed that out of 105 patients, 64 (61%) has symmetric molar relationship and 41 (39%) had asymmetric molar relationship (Table I). This was statistically significant as p-value was 0.000. Class I molar relationship was the most prevalent relationship found (50.5 % on right side and 52.4% on left side). Second most prevalent molar relationship was full cusp class II molar relationship,

which was 22.9% on both right and left sides. Third most prevalent scheme was class II 1/2 cusp (16.4 % on right side and 12.4 % on left side). Least prevalent relationship found was full cusp class III being 1% on both right and left sides (Table II and III).

Out of 64 symmetric molar relationship patients, bilateral class I molar relationship was found in 43 patients, bilateral class II full cusp relationship was found in 13 patients and bilateral 1/2 cusp molar relationship was found in 6 patients (Table IV).

Table I. Molar Relationship Symmetry/Asymmetry

Asymmetric Molar Relationship	41	39.0
Symmetric Molar Relationship	64	61.0
Total	105	100.0

Table II: Molar Relationship Right Side

	Frequency	%
Class I	53	50.5
Class II 1/4 Cusp	4	3.8
Class II 1/2 Cusp	17	16.2
Class II 3/4 Cusp	5	4.8
Class II Full Cusp	24	22.9
Class III 1/2 Cusp	1	1.0
Class III Full Cusp	1	1.0
Total	105	100.0

Table III: Molar Relationship Left Side

Class I	55	52.4
Class II 1/4 Cusp	4	3.8
Class II 1/2 Cusp	13	12.4
Class II 3/4 Cusp	5	4.8
Class II Full Cusp	24	22.9
Class III 1/2 Cusp	3	2.9
Class III Full Cusp	1	1.0
Total	105	100.0

Table IV: Cross tabulation of Right and Left Molar Relationship

			Molar Relationship Right						Total	
			Class I	Class II 1/4 Cusp	Class II 1/2 Cusp	Class II 3/4 Cusp	Class II Full Cusp	Class III 1/2 Cusp		Class III Full Cusp
Molar Relationshi p Left	Class I	Count	43	1	5	0	6	0	0	55
		% of Total	41.0%	1.0%	4.8%	0.0%	5.7%	0.0%	0.0%	52.4%
	Class II 1/4 Cusp	Count	1	2	1	0	0	0	0	4
		% of Total	1.0%	1.9%	1.0%	0.0%	0.0%	0.0%	0.0%	3.8%
	Class II 1/2 Cusp	Count	3	0	6	2	2	0	0	13
		% of Total	2.9%	0.0%	5.7%	1.9%	1.9%	0.0%	0.0%	12.4%
	Class II 3/4 Cusp	Count	0	1	0	1	3	0	0	5
		% of Total	0.0%	1.0%	0.0%	1.0%	2.9%	0.0%	0.0%	4.8%
	Class II Full Cusp	Count	5	0	4	2	13	0	0	24
		% of Total	4.8%	0.0%	3.8%	1.9%	12.4%	0.0%	0.0%	22.9%
	Class III 1/2 Cusp	Count	1	0	1	0	0	0	1	3
		% of Total	1.0%	0.0%	1.0%	0.0%	0.0%	0.0%	1.0%	2.9%
	Class III Full Cusp	Count	0	0	0	0	0	1	0	1
		% of Total	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	1.0%
Total	Count	53	4	17	5	24	1	1	105	
	% of Total	50.5%	3.8%	16.2%	4.8%	22.9%	1.0%	1.0%	100.0%	

Discussion

The present study aims to find the prevalence of asymmetric occlusion existing in a Pakistani sample. This has clinical and diagnostic implications. The best way to move forward in orthodontic mechanics is to have symmetry. This holds true for extractions as well as planning for force delivery systems. Current study findings of asymmetric molar relationship (61%) and symmetric molar relationship (39%) were slightly different than the findings by Khan¹³ who showed 56% and 33.2% respectively. Bhateja¹⁴ also showed molar asymmetry to be around 45.5%. Asymmetric molar relationship found by Behbhani¹⁵ was 29.7% and symmetric molar relationship was 70.3%. Asymmetric molar relationship given by Anistoroaei¹⁶ was 24.7% and symmetric molar relationship was 75.3%. Asymmetric molar relationship found by Asiry¹⁷ was 22.6% and symmetric molar relationship was 77.4%. Molar relation asymmetry equivalent to half cusp (Class I on one side and class II 1/2 cusp or class III 1/2 cusp on other side was

found in 8 (7.6%) patients in the present study and the asymmetry equivalent to full cusp (Class I on one side and full cusp class II or class III on other side) was found in 11 patients (10.4%). Study by Khan¹³ showed different results than the current study as half step asymmetry was found in 22.4% cases and full steps asymmetry was found in 10.6% cases. Study by Behbhani¹⁵ showed half step asymmetry in 26% cases and full steps asymmetry in 3.6% cases respectively. Gábris¹⁸ reported that a half-step anomaly in the antero-posterior molar relationship was more prevalent than a full step anomaly (26.9 and 20.3 percent respectively) in a Hungarian population using the World Health Organization questionnaire. Similarly, Lux¹⁹ reported a half step malocclusion to be more common than a full-step malocclusion in 494 German school children.

This study did not include the other aspects of malocclusion which are required for diagnosis and treatment planning. It was focused to find the asymmetry in molar relationship in a Pakistani sample.

Conclusions

Asymmetric molar relationship is found in orthodontic patients while vast majority had symmetric molar relationship. Asymmetry in molar relationship equivalent to full cups is more common than asymmetry in molar relationship equivalent to half cusp molar relationship.

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