Journal of Research in Medical and Dental Science
2022, Volume 10, Issue 6, Page No: 65-69

Available Online at: www.jrmds.in
eISSN No. 2347-2367: pISSN No. 2347-2545

Clinical, Subclinical Characteristics, and Treatment Results of Class I Malocclusion in Vietnam

Nguyen My Huyen[1], Le Nguyen Lam[2], Do Thi Thao[3*], Le Vu Phuong Khanh[1]

[1]Faculty Odonto-Stomatology, Can Tho University Medicine and Pharmacy, Viet Nam
[2]Department of Pediatrics and Orthodontics, Faculty Odonto-Stomatology, Can Tho University Medicine and Pharmacy, Viet Nam
[3]Department of Oral Pathology and Periodontology, Faculty Odonto-Stomatology, Can Tho University Medicine and Pharmacy, Viet Nam

ABSTRACT

Introduction: The prevalence of Class I malocclusion was found to be high that could affect esthetics or function. The study aimed to evaluate clinical, subclinical characteristics, and treatment results of Class I malocclusion.

Methods: A cross-sectional study of 31 students, including 16 females and 15 males, with Class I malocclusion.

Results: 26 students (83.9%) had symmetrical faces. The prevalence of Anderson's subtype I was the highest (77.5%). 22 students (70.1%) had oval-shaped dental arches. The anterior-posterior bimaxillary decal age (ANB angle) was 2.59o ± 1.44. The upper and lower incisors were not only proclaimed but also protruded. Angle between the long axis of the upper incisor and palatal plane (1-Pal) and the angle between the long axis of the lower incisor and mandibular plane (1-MP) were bigger than the standard values. Anterior-posterior position of upper and lower lips about the S-line was much bigger than the normal range. Before treatment, the average PAR score of the research group was 21.94 and after the treatment, the average PAR score was 2.23. Mid- malocclusion was the most common (42.5%). The overall effect of this treatment was 93.5%.

Conclusions: Class I malocclusion had complex clinical and subclinical characteristics.

Key words: Occlusion, Angle classification, PAR, Dental students, Vietnam

HOW TO CITE THIS ARTICLE: Nguyen My Huyen, Le Nguyen Lam, Do Thi Thao, Le Vu Phuong Khanh, Clinical, Subclinical Characteristics, and Treatment Results of Class I Malocclusion in Vietnam, J Res Med Dent Sci, 2022, 10 (6):65-69.

Corresponding author: Do Thi Thao

e-mail✉: dtthao@ctump.edu.vn

Received: 31 May-2022, Manuscript No. JRMDS-22-65508;

Editor assigned: 01-June-2022, **PreQC No.** JRMDS-22-65508 (PQ);

Reviewed: 16-June-2022, QC No. JRMDS-22-65508;

Revised: 20 -June-2022, Manuscript No. JRMDS-22-65508 (R);

Published: 27-June-2022

INTRODUCTION

Malocclusion could impair long-term psychosocial well-being, and it had been suggested that facial features, especially oral aesthetics, had the potential to influence self-perceived appearance, especially during life with strong social and emotional interactions [1-3]. Among the types of malocclusion, type I malocclusion was the most common type in the world and Vietnam [4-6]. According to Soh Jen et al. in a study of 339 Asian men, the highest class I malocclusion rate was 48.1% [7]. Meanwhile, Nguyen Thi Kim Yen's et al. study in the South of Vietnam (2012) showed that Class I malocclusion accounts for 66% [8]. The mid-1930s and 1940s introduced orthodontic treatment with an appropriate appliance, which moves the teeth at the base of the bone to accommodate the underlying skeletal abnormality [9,10]. In Can Tho at that time, various types of examinations, assessments, clinical examinations, and X-ray examinations, especially for Class I malocclusion, were lacking. In this study, the clinical and subclinical qualities of Class I malocclusion and the treatment aftereffects of Class I malocclusion were investigated.

METHODS

Participants

The content of the study included a description of clinical features such as facial symmetry, face shape, mandibular profile in lateral view, mentolabial sulcus, lip position in lateral view, temporomandibular joint status, classification of class I malocclusion according to Anderson, the condition of crowded teeth/ impacted teeth. Also describing the subclinical features such as the shape of the dental arch, the components of the PAR index (peer rate assessment), the variables on the lateral Cephalometric radiograph including the angular

measurement of maxillary position (SNA), the angular measurement of mandibular position (SNB), sagittal jaw relationship (ANB), the edge of upper incisor to NA line distance (Is–A), the axis of upper incisor to NA line angle (ILs/NA), Edge of lower incisor to NB line distance (Ii-NB), the axis of lower incisor to NB line angle (ILi/NB), the angle formed between the long axis of the upper incisor and the palatal plane (1-Pal), the angle formed by the long axis of the upper and lower incisors (1-1), the angle formed between the long axis of the lower incisor and the mandibular plane (1-MP), the position of the upper lip and the lower lip reference to the aesthetic S-line (Ls-SL, Li-SL) [11,12]. In addition, assessment of the treatment results is based on the changes in bone, teeth, and soft tissue on lateral Cephalometric radiograph and evaluation of post-treatment [13-15].

Inclusion criteria

Willingness to participate.

Only dental students with Class I malocclusion had a full set of permanent teeth and had not had orthodontic treatment before, and without a significant break or missing or having prosthodontics treatment of first permanent molars [16-18].

Exclusion criteria

The study did not include students having orthodontic treatment before, students with maxillofacial congenital defects, students with a history of maxillofacial trauma having bone orthopedic surgery before, students with periodontal disease, and students who are uncooperative during the research process [6,17,18].

Procedure

It was a descriptive cross-sectional study. The aims and objectives of the study were explicitly explained to the participants before the commencement of the study. All participants voluntarily gave written informed consent to participate in the study.

The survey consisted of 5 parts.

Part 1: Ask for the general information of students; perform clinical examination (including external and internal examination) to determine the type of malocclusion, and record in the data collection form uniformly for all students.

Part 2: Students with class I malocclusion are taken impression, X-ray film taken. Determination of variables of class I malocclusion in students.

Part 3: Diagnosis and treatment of class I malocclusion according to Angle.

Part 4: Take the impression of the jaw sample; take a panorama, and the lateral Cephalometric radiograph to compare with before treatment.

Part 5: Evaluate treatment results.

Statistical analyses

Measured values are given as a mean +/- standard deviation (SD). Statistical analysis was performed using SPSS for Windows version 18. For measurable assessments, an investigation of fluctuation was performed, trailed by the Tukey post hoc test. Wilcoxon marked position to test for non-standard quantitative factors. The straight relationship between's factors is shown by the Pearson connection coefficient. Power examination showed that 31 dental students would accomplish a factual force of 80% at an important level of 0.05.

RESULTS

The study was conducted on 16 female students (51.6%) and 15 male students (48.4%). As for Clinical characteristics of extraoral examination from a lateral view (Table 1), up to 83.9% of the students had symmetrical faces; 74.2% of the students had average face shapes. As for the facial features facing the profile (Table 2), 17 students had convex face shapes from a lateral view, accounting for 54.8%. Among characteristics of temporomandibular joint of research subjects (Table 3), 67.8% of the students had good temporomandibular joint quality, accounting for the highest proportion, and the lowest was poor temporomandibular joint quality, accounting for 3.2%. Most cases were forms of malocclusion with many different subtypes, with subtype 1 having the highest percentage at 77.5% (Table 4). Arch characteristics of study participants (Table 5), students with an oval maxillary arch shape had the highest use rate at 71.0%, while the tampered arches had the lowest use rate at 6.4%. Students with oval mandibles were the majority at 77.4%, while those who were manipulated had the lowest at 3.2%. Among the 31 graduate students, 14 had moderate malocclusion (PAR < 20-29), accounting for 45.2%, and only 2 had normal occlusion (PAR < 10), the lowest, accounting for 6.5% (Figure 1).

Evaluation of the treatment effect, the change of the bone index of the lateral X-ray film before and after treatment (Table 6), the average point of the lateral X-ray film decreased more than that before treatment. Especially the angle change SNA, ANB showed a statistically significant difference, $p<0.05$. The upper and lower incisors are not only forward but also lordotic. The mean value of the tooth index on the lateral Cephalometric images decreased more than before treatment. The changes of

Is-NA, ILs/NA, Ii-NB, U1-L1, and 1-Pal index were statistically significant, $p < 0.05$ (Table 7). Changes of tooth index on lateral X-ray films before and after treatment (Table 8), all PAR index changes before and after treatment, the difference was statistically significant, $p<0.001$. After treatment, 29 students had a good treatment effect, accounting for 93.5%, and 1 student had a moderate treatment effect, accounting for 6.5% (Figure 2).

Table 1: Clinical characteristics of extraoral examination from a lateral view.

Clinical characteristics	Frequency (n)	Rate (%)
Facial symmetry		
Symmetry	26	83.9
Deviate left	2	6.5
Deviate right	3	9.6
Face shape		
Long	5	16.1
Average	23	74.2
Short	3	9.7

Table 2: Characteristics of face shape from a lateral view.

Characteristics (n=31)	Frequency (n)	Rate (%)
Convex	17	54.8
Concave	7	22.6
Straight	7	22.6

Table 3: Characteristics of temporomandibular joint of research subjects.

Characteristics of temporomandibular joint (n=31)	Frequency (n)	Rate (%)
Good	21	67.8
Moderately	9	29
Poor	1	3.2

Table 4: Classification of class I malocclusion according to Anderson.

Class I	Patients		Rate (%)		
	Simple	Combine	Simple	Combine	Total
Type 1	10	14	32.3	45.2	77.5
Type 2	4	1	12.9	3.2	16.1
Type 3	1	9	3.2	29	32.2
Type 4	0	6	0	19.4	19.4
Type 5	0	9	0	29	29

Table 5: Characteristics of the dental arch of research subjects.

Characteristics (n=31)	Maxillary		Mandible	
	Frequency (n)	Rate (%)	Frequency (n)	Rate (%)
Ovoid	22	71	24	77.4
Tampered	2	6.4	1	3.2
Square	7	22.6	6	19.4

Table 6: The change in the bone index on the lateral Cephalometric radiograph before and after treatment.

Characteristics	Before treatment	After treatment	p*
SNA (0)	81.93 ± 2.86	81.21 ± 3.21	0.029
SNB (0)	79.18 ± 3.02	79.0 ±3.36	0.861
ANB (0)	2.59 ± 1.44	2.25 ± 1.21	0.021

Table 7: The change in teeth index on the lateral Cephalometric radiograph before and after treatment.

Characteristics	Before treatment	After treatment	p*
Is –NA	6.37 ± 2.51	5.55 ± 1.95	0.023
ILs /NA	29.09 ± 7.30	26.19 ± 6.64	0.05
Ii – NB	6.47 ± 2.62	5.74 ± 2.18	0.047
ILi/ NB	31.81 ± 7.79	29.28 ± 7.67	0.086
U1–L1	116.37 ± 11.67	122.16 ± 8.34	0.023
Pog–NB	0.67 ± 1.45	1.06 ± 1.44	0.162
1-Pal (0)	120.50 ± 7.56	115.67 ± 6.45	<0.001
1-MP (0)	95.09 ± 7.82	95.11 ± 6.68	0.984
* Paired Sample T-test.			

Table 8: The change in soft tissue index on the lateral Cephalometric radiograph before and after treatment.

Characteristics	Before treatment	After treatment	p*
Ls-SL	2.04 ± 1.99	1.03 ± 1.08	0.002
Li-SL	3.74 ± 2.75	1.84 ± 1.74	<0.001
* Paired Sample T-test.			

Table 9: The changes in PAR index before and after treatment before and after treatment.

PAR (n=31)	Before treatment	After treatment	Change	p*
Crowding	4.29 ± 2.19	0.1 ± 0.3	4.19 ± 2.27	<0.001
Occlusal	1.41 ± 0.92	0.48 ± 0.72	0.94 ± 0.99	
Overjet	11.23 ± 6.34	0.39 ± 1.50	10.84 ± 6.08	
Overbite	2.13 ± 1.36	0.32 ± 0.75	1.80 ± 1.49	
Deviated midline	3.23 ± 2.17	1.03 ± 1.78	2.19 ± 2.27	
Total	21.94 ± 7.71	2.23 ± 2.69	17.68 ± 6.89	
* Paired Sample T-test.				

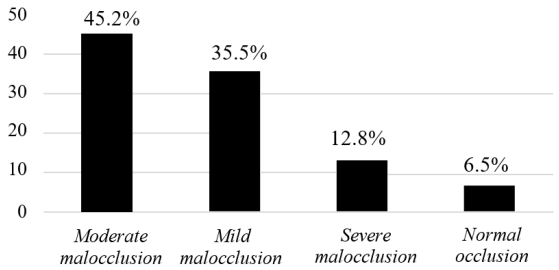

Figure 1: PAR Classification.

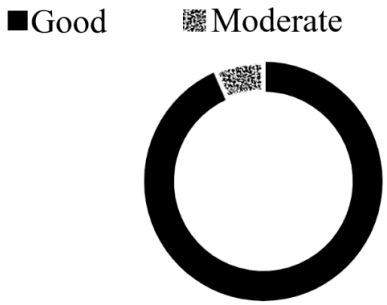

Figure 2: Evaluating treatment results.

DISCUSSION

Clinical and subclinical qualities

In a study of 32 students, of whom 26 had 83.9% of the faces proportional, 3 (9.6%) had a right face and 2 (6.5%) had a misleading left face. This result was consistent with the study by author Le Bich Van, et al. in which a sample size of 31 included facial balance in 90.3% of study participants. In the case of type I malocclusion, the correlation between the maxillary and mandible remained harmonious [19]. This disease was caused only by the teeth or alveolar bone. In terms of face shape, the average face shape of most patients was 74.2%; 16.1% were long and 9.7% were short. This result was consistent with the study by Quach Thi Thuy Lan, et al. in the case of a sample size of 86, the average face shape accounted for 54.65%, the long face shape accounted for 24.1%, and the short face shape accounted for the lowest proportion, which was 20.94% [20]. On the profile, we

found the highest proportion of students with convex faces at 54.8%, and those with concave and flat faces at 22.6% (Table 2). The findings were lower than Le Bich Van's, et al. [19], with a convexity ratio of 61.3%. 67.8% of the students had good TMJ condition; 29% were good and 3.2% were bad (Table 3). This rate was consistent with Le Bich Van, et al. before treatment, the patients with the good temporomandibular joint condition, no temporomandibular joint disease function, and somatic symptoms accounted for the highest proportion of 64.5%, 25 patients could see normally, accounted for 32.3% [19].

The review found that the most prevalent occlusal cases in Class I – Type 1 were identified as more than 10 students identified as single (32.3%) and 14 students identified as combined structures (45.2%). This is followed by deviation in Class I–Type 3 with 9 students having mixed deviations of other types and 3 students having Class I-Type 3 deviations as single (32.2%). Class I – Type 5 consisted of 9 students (29.0%) and all had other malocclusions. Class I–Type 4 has 6 students identified as combined structures (19.4%) and at least Class I -Type 2 with 4 students identified as single and 1 student identified as combined structures (16 .1%). Thus, we saw that in Angle Class I malocclusion, the majority of cases is in the form of malocclusion with a combination of many different deviations according to Anderson's classification. The Angle classification of occlusion had the limitation that it could only evaluate the anteroposterior relationship and was based on the relationship between the first molars and canines [21]. This classification did not show the skeletal structure and facial harmony, as well as facial harmony. Therefore, Anderson had divided Angle's class I malocclusion into 5 types that are suitable for common clinical first molar malocclusions [22].

Of the 31 subjects examined, the maxillary arch was egg-shaped in 71%, square in 22.6%, and triangular in 6.4% (Table 5). The results were consistent with the study of author Dong Thi Mai Huong, et al. with oval and square arches accounting for more than 80% [23]. This compatibility can be explained because the aforementioned authors also conducted studies in adulthood between the ages of 18 and 33, which demonstrated that Vietnamese had the same yellow-skinned ethnicity and geography, with no differences in the shape of the dental arches between men and women. Compared with some other studies in the world, such as the study of Japanese by Nojima K (2001), similar results were also given, the oval shape of the teeth was the majority, accounting for 88.1%, and the shape of the dental arch was only triangular 11,9 % [24].

Evaluate the outcome of treatment

The lateral Cephalometric radiograph was an important part of orthodontic evaluation and treatment. When estimating the files on the displaced skull slices at the time of treatment, as shown by the results presented in Tables 6, 7, and 8, almost no borderline changes in SNA, SNB, ANB points were observed. It was also reasonable and predictable, with a class I occlusal characteristic, i.e. a class I occlusal remnant with a good connection in the anterior-posterior direction and no deviation between the maxillary and mandible, showing interfering effects of teeth or bones. through the alveolar bone. The list of teeth and fragile tissues changed in general, and in the extraction bundles in particular, the quality was near normal. This shows that the treatment effect was very good, not only were the teeth had been treated, but also the slope of the toothed hub, the slope everywhere, and the inner slope had also been well changed. It was these important factors that contribute to long-term stable orthodontic treatment outcomes with fewer repetitions.

The normal PAR file in our tests was 22.29 points lower than the 32.75 points of Quach Thi Thuy Lan, et al. [20]. Quach Thi Thuy Lan appropriately expanded the PAR list, examining subjects with 4 posterior incisors that contrasted with Class I-type 1[20]. In the bench survey to determine the PAR (W) of the part coefficient, the evaluation of key champions was the most significant, followed by frontal local abnormalities and at least 1.41 point left-right deviations. This makes sense because overbite and abnormal areas of the front teeth were factors that greatly influenced the perception of orthodontic requirements in the second study [25]. The PAR (W) record after treatment was 2.32 ± 2.64 (Table 9), demonstrating that the occlusal joint is completely very much guaranteed as far as capacity and soundness. The post-treatment PAR recording was lower than the exploratory sequence of 5.2 [6] by Le Bich Van, et al. [19].

In this review, outcomes were assessed according to treatment goals as well as practicality, fashion, and dental regulations. In the verification trial, all the secondary patients achieved the treatment goal and the treatment effect was good 29 students accounted for 93.5%, 2 students reached 6.5%, and no students were the helpless outcome.

CONCLUSION

The results of this clinical feature study showed that among the 31 cases of subclinical class I malocclusion, Anderson class I malocclusion accounted for the highest proportion of 77.5%. The majority of dental students had upright facial symmetry, accounting for 83.9%, and the lateral cephalometric radiograph has a good correlation in a posterioanterior direction. The average PAR scores for the entire test group were 21.94 and 2.23. The overall effect of this treatment was 93.5%.

REFERENCES

1. https://dentodontics.com/2015/09/09/angles-classification-of-malocclusion/
2. Masood M, Masood Y, Newton T. Cross-bite and oral health related quality of life in young people. J Dent 2014; 42:249-55.

3. Närhi L, Tolvanen M, Pirttiniemi P, et al. Malocclusion severity and its associations with oral health-related quality of life in an adult population. Eur J Orthod 2021.
4. Lee K-j, Trang VTT, Bayome M, et al. Comparison of mandibular arch forms of Korean and Vietnamese patients by using facial axis points on three-dimensional models. Korean J Orthod 2013; 43:288-293.
5. Hudson T. An overview of the dental and skeletal relationships in individuals of vietnamese ancestry: University of Southern California. (Doctoral dissertation) 2019.
6. Nguyen SM, Nguyen MK, Saag M, et al. The need for orthodontic treatment among Vietnamese school children and young adults. Int J Dent 2014; 2014.
7. Soh J, Sandham A, Chan YH. Occlusal status in Asian male adults: Prevalence and ethnic variation. Angle Orthod 2005; 75:814-820.
8. Bourzgui F, Sebbar M, Hamza M, et al. Prevalence of malocclusions and orthodontic treatment need in 8-to 12-year-old schoolchildren in Casablanca, Morocco. Progress Orthod 2012; 13:164-172.
9. Andrews LF. The six keys to normal occlusion. Am J Orthod 1972; 62:296-309.
10. Littlewood SJ, Mitchell L. An introduction to orthodontics: Oxford University Press 2019.
11. Imani MM, Hosseini SA, Arab S, et al. Characterization of soft tissue cephalometric norms of Kurdish population of Iran. J Re Med Dent Sci 2018; 6:335-342.
12. Imani MM, Falah-Kooshki S, Sobhani M, et al. Determination of facial height dimensions in Iranian Kurdish population. J Res Med Dent Sci 2018; 6:435.
13. Nasser A, Alshammari R, Al-Jewair T, et al. Post-orthodontic pharyngeal airway changes following first premolar extraction and incisor retraction in bimaxillary protrusion patients-a retrospective study. J Res Med Den Sci 2019; 7:29-38.
14. Shahba'a A, Nissan L, Ahmed H, et al. Sagittal lips' positions in different facial types. J Res Med Dent Sci 2018; 6:16-21.
15. Celikdelen M, Bicakci AA. Factors affecting smile attractiveness: An eye tracking study. J Res Med Dent Sci 2020; 8:56-70.
16. Lim WH, Kim HJ, Chun YS. Treatment of ankylosed mandibular first permanent molar. Am J Orthod Dentofac Orthop 2008; 133:95-101.
17. Rodrigues L, Jawale B, Kadam A, et al. Single phase correction of tongue thrust habit alongside fixed orthodontic treatment for closure of spaced dentition and midline diastema in a male patient with class I malocclusion without need for a two phase appliance therapy: A case report. Indian J Orthod Dentofac Res 2020; 6:163-169.
18. Silvola AS, Varimo M, Tolvanen M, et al. Dental esthetics and quality of life in adults with severe malocclusion before and after treatment. Angle Orthod 2014; 84:594-599.
19. Van LTB. Treatment effects of fixed functional appliances in patients with Class I malocclusion. Vietnam Military Medical University. 2011.
20. de Arruda MB. Angle class III malocclusion with anteroposterior and vertical discrepancy in the final stage of growth. Dent Press J Orthod 2017; 22:109-18.
21. Singh G. Chapter 7: Diagnostic Aids case history and clinical examination. Textbook of Orthodontics. 3rd Edn, Jaypee 2015; 61-72.
22. Trang HTT. Orthodontic maxillofacial. Medical Publishing House 2004; 84-112.
23. Foster TD, Walpole Day AJ. A survey of malocclusion and the need for orthodontic treatment in a Shropshire school population. Br J Orthod 1974; 1:73-78.
24. Nojima K, McLaughlin RP, Isshiki Y, et al. A comparative study of Caucasian and Japanese mandibular clinical arch forms. Angle Orthod 2001; 71:195-200.
25. Dung TM, Ngoc VT, Khoi TD, et al. The dental arch dimensions in Vietnamese children at 7 years of age, and their variation by gender and ethnicity. J Oral Biol Craniofac Res 2019; 9:236-240.