

Kertas Asli/Original Articles

Pattern of Malocclusion Among Orthodontic Patients in East Coast of Sabah (Corak Maloklusi di Kalangan Pesakit Ortodontik di Pantai Timur Sabah)

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ABSTRACT

This study reviewed the pattern of malocclusion among orthodontic patients in East Coast of Sabah and the type of treatment indicated for the patients. A total of 138 pre-treatment orthodontic records of patients who attended the orthodontic consultation clinic in year 2018 were included in this cross-sectional retrospective study. Data taken were demographic data, source of referral, BSI (British Standards Institutes) incisor classification, skeletal pattern, and type of treatment. All data were analysed descriptively using Stata 15. Based on the results, mean age of the patients was 16.89 ± 0.37 years. More females sought orthodontic treatment ($n=101$, 73.19%) than males. Majority of the patients were Chinese ($n=68$, 49.28%) and Bumiputera Sabah ($n=55$, 39.86%). Main source of referral was from dental officers ($n=128$, 92.75%). The distribution of malocclusion showed high percentage of Class II Division 1 ($n=56$, 40.58%), followed by Class III ($n=45$, 32.61%), Class I ($n=34$, 24.64%) and Class II Division 2 ($n=3$, 2.17%). For skeletal pattern, more patients presented with Class II ($n=54$, 39.13%), while the number of patients presented with Class I and Class III were equal ($n=42$, 30.43%). Class III malocclusion ($n=29$, 42.65%) and Class III skeletal pattern ($n=29$, 42.65%) were more common in Chinese patients. Treatment indicated was mostly fixed orthodontic appliance ($n=120$, 86.96%). In conclusion, Class II Division 1 malocclusion and Class II skeletal pattern were most common among the patients. Class III malocclusion and Class III skeletal pattern were typical features among the Chinese patients. Fixed orthodontic appliance was the most common treatment method.

Keywords: pattern; malocclusion; orthodontic

ABSTRAK

Kajian ini mengkaji corak maloklusi di kalangan pesakit ortodontik di Pantai Timur Sabah dan jenis rawatan yang diberikan. Sebanyak 138 rekod ortodontik pra-rawatan pesakit yang menghadiri klinik perundingan ortodontik pada tahun 2018 digunakan dalam kajian keratan rentas retrospektif ini. Data yang diambil adalah data demografik, sumber rujukan, BSI (British Standards Institutes) klasifikasi insisor, corak pola rangka, dan jenis rawatan. Semua data dianalisis secara deskriptif dengan menggunakan Stata 15. Berdasarkan hasil analisis, purata umur pesakit adalah 16.89 ± 0.37 tahun. Lebih banyak perempuan ($n = 101$, 73.19%) mendapatkan rawatan berbanding lelaki. Kebanyakan pesakit berbangsa Cina ($n = 68$, 49.28%) dan Bumiputera Sabah ($n = 55$, 39.86%). Punca utama rujukan adalah daripada pegawai pergigian ($n = 128$, 92.75%). Klasifikasi insisor menunjukkan maloklusi Kelas II Divisi 1 adalah tertinggi ($n = 56$, 40.58%), diikuti oleh Kelas III ($n = 45$, 32.61%), Kelas I ($n = 34$, 24.64%) dan Kelas II Divisi 2 ($n = 3$, 2.17%). Untuk corak pola rangka, lebih banyak pesakit mempunyai Kelas II ($n = 54$, 39.13%), manakala bilangan pesakit Kelas I dan Kelas III adalah sama ($n = 42$, 30.43%). Maloklusi Kelas III ($n = 29$, 42.65%) dan pola rangka Kelas III ($n = 29$, 42.65%) lazim dilihat pada pesakit berbangsa Cina. Rawatan diberikan kebanyakannya aplians ortodontik tetap ($n = 120$, 86.96%). Kesimpulannya, maloklusi Kelas II Divisi 1 dan pola rangka Kelas II adalah paling lazim. Maloklusi Kelas III dan pola rangka Kelas III adalah ciri khas di kalangan pesakit berbangsa Cina. Aplians ortodontik tetap paling biasa digunakan.

Kata kunci: corak; maloklusi; ortodontik.

INTRODUCTION

Malocclusion is an appreciable deviation from the ideal occlusion (Houston et al. 1992). It is a condition of teeth not in alignment or incorrect relation of the upper and lower dental arches. It is largely caused by genetically-determined dental and facial development, while environmental influences have less impact on this development. However, both genetic and environmental factors contributed together, causing malocclusion (Proffit 1986). Malocclusion is an important oral health problem due to its high prevalence (Marques et al. 2009) and wide preventive and treatment possibilities (Karaikos et al. 2005). It affects oral health, functional well-being, and self-esteem (Anthony et al. 2018).

A number of studies have been conducted on the pattern of malocclusion. The pattern of malocclusion has been found varies among different populations and regions. The common methods used to classify malocclusion are Angle Classification and British Standards Institute Classification 1983. British Standards Institute Classification 1983 was found to be more reliable (Du et al. 1998).

Appraisal on the pattern of malocclusion is important as a baseline data for planning of treatment, materials, annual budget, manpower and expertise needs in government dental clinic. This research was done based on the localities of the researchers. Currently, in East Coast of Sabah, there were two orthodontic clinics located in Sandakan and Tawau, offering specialist orthodontic services under the Ministry of Health Malaysia. The objectives of this study were to review the pattern of malocclusion among patients seeking orthodontic treatment in East Coast Sabah and the type of treatment indicated for the patients.

METHODS

This is a cross-sectional, retrospective study on 138 pre-treatment orthodontic records of patients who attended the orthodontic consultation at the two government orthodontic clinics in the year 2018 in East Coast of Sabah. Ethical approval to conduct this study was obtained from the Research Ethics Committee of the Ministry of Health Malaysia (NMRR-18-3693-41641).

All patients who fulfilled the inclusion criteria were recruited via convenient sampling in this study. The inclusion criteria were patients referred from the dental nurses, dental officers, dental specialists, or from the private dentists, attended the orthodontic consultation clinic and were examined by two orthodontists. The exclusion criteria

were patients presented with congenital syndromes or craniofacial deformities e.g. cleft lip and palate and patients who had orthodontic treatment before.

Data collection was based on written case notes, radiographs, and study models. Data taken were demographic data (age, gender, and ethnic groups), referral source, BSI (British Standards Institutes) incisor classification, skeletal pattern, and type of treatment indicated for the patients. All variables were analysed descriptively using Stata 15. The differences between the groups were tested using Fisher's exact test. The level of significance was set at 5% ($p < 0.05$).

RESULTS

The mean age of the patients was 16.89 ± 0.37 years. More than two-thirds of the patients were females ($n=101$, 73.19%). Majority of the patients were Chinese ($n=68$, 49.28%) and Bumiputera Sabah ($n=55$, 39.86%). Main source of patient referral was from the dental officers ($n=128$, 92.75%) (Table 1).

The distribution of malocclusion pattern, showed more patients presented with incisor relationship Class II Division 1 ($n=56$, 40.58%), followed by Class III ($n=45$, 32.61%), Class I ($n=34$, 24.64%) and Class II Division 2 ($n=3$, 2.17%). However, among the ethnic groups, incisor relationship Class III was typical features among Chinese patients ($n=29$, 42.65%), while Class II Division 1 and Class II Division 2 were more common among Bumiputera Sabah (Class II Division 1: $n=28$, 50.91%; Class II Division 2: $n=3$, 5.45%) (Table 2).

For skeletal pattern, most patients had Class II ($n=54$, 39.13%), while an equal number of patients presented with Class I and Class III each ($n=42$, 30.43%). However, among the ethnic groups, Class III skeletal pattern was typical feature among Chinese patients ($n=29$, 42.65%), while Class II skeletal pattern was more common among Bumiputera Sabah ($n=26$, 47.27%) (Table 3).

Treatment indication was mostly fixed orthodontic appliance ($n=120$, 86.96%). Other treatment indications were functional appliance ($n=6$, 4.35%), no treatment needed ($n=5$, 3.62%), fixed appliance and orthognathic surgery ($n=3$, 2.17%), and others ($n=4$, 2.90%) (Figure 1).

There were no significant differences between females and males with respect of the malocclusion and skeletal pattern, $p > 0.05$. There were also no significant differences between ethnic groups with respect of malocclusion, $p > 0.05$. However, there were significant differences between ethnic groups with respect of skeletal pattern, $p < 0.05$.

TABLE 1. Demographic profile of the patients

Variables		n (%)	Mean ± SE
Age			16.89 ± 0.37
Gender	Female	101 (73.19)	
	Male	37 (26.81)	
Ethnicity	Chinese	68 (49.28)	
	Bumiputera Sabah	55 (39.86)	
	Others	15 (10.87)	
Primary source of referral	Dental Officers	128 (92.75)	
	Others	10 (7.25)	

TABLE 2. Malocclusion pattern of the ethnic groups

Ethnicity	Class I n (%)	Class II Div 1 n (%)	Class II Div 2 n (%)	Class III n (%)	Total n (%)
Chinese	17 (25.00)	22 (32.35)	0 (0.00)	29 (42.65)	68 (100.00)
Bumiputera Sabah	13 (23.64)	28 (50.91)	3 (5.45)	11 (20.00)	55 (100.00)
Others	4 (26.67)	6 (40.00)	0 (0.00)	5 (33.33)	15 (100.00)
Total	34	56	3	45	138

Fisher's exact = 0.060

TABLE 3. Skeletal pattern of the ethnic groups

Ethnicity	Class I n (%)	Class II n (%)	Class III n (%)	Total n (%)
Chinese	17 (25.00)	22 (32.35)	29 (42.65)	68 (100.00)
Bumiputera Sabah	20 (36.36)	26 (47.27)	9 (16.36)	55 (100.00)
Others	5 (33.33)	6 (40.00)	4 (26.67)	15 (100.00)
Total	42	54	42	138

Fisher's exact = 0.034

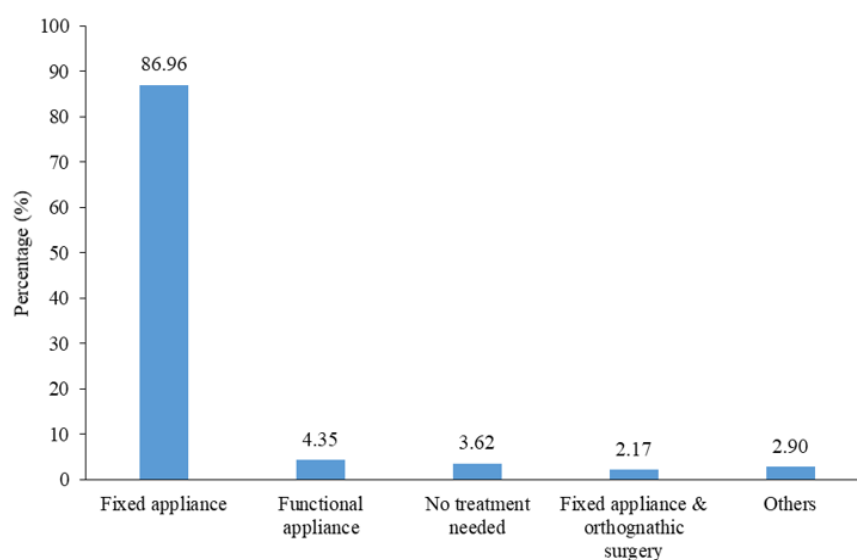


FIGURE 1. Treatment indications for the patients

DISCUSSION

Malaysia is a multi-ethnic country. The three major ethnic groups in Malaysia are the Malay, Chinese, and Indian (Nagaraj et al. 2015) with diverse cultural backgrounds (Kaboudarahangi et al. 2013). Orang Asli are the natives in Peninsular Malaysia. In 2015, the divisions by ethnics are as follow: Bumiputera (61.8%), Chinese (21.4%), Indian (6.4%), others (0.9%), and Non-Malaysian Resident (9.6%) (Malaysia Information 2016).

The population of Sabah consists of 33 ethnic groups, and communicate in more than 50 languages and 80 dialects. Kadazan Dusun is the largest ethnic group in Sabah which makes up about one-third of the total population. Chinese is the main ethnic group of non-Bumiputera (Kerajaan Negeri Sabah 2020). However, in this study, majority of the patients were Chinese. This might be due to higher awareness among the Chinese to seek orthodontic treatment compared to the other ethnic groups.

Nearly three-quarters of the patients were females. Females seemed to be more aware of facial and dental aesthetic. Anthony et al. (2018) found that malocclusion had higher impact on females regarding oral health-related quality of life even though prevalence of malocclusion was higher in males.

The pattern of malocclusion had been found to vary with the different population, ethnic, and origin. In this study, the percentage of Class I malocclusion was similar to Malay, a study done in Pahang (Ismail et al. 2017), but lower than Bangladeshi (Rahman et al. 2013). Percentage of Class II Division 1 malocclusion was similar to Bangladeshi (Rahman et al. 2013), but lower than Pakistani (Gul-e-Erum & Fida 2008). Percentage of Class II Division 2 malocclusion was lower than Malay (Ismail et al. 2017), but similar to Bangladeshi (Rahman et al. 2013). Percentage of Class III malocclusion was similar to Malay (Ismail et al. 2017), but higher than Bangladeshi (Rahman et al. 2013).

Among the ethnic groups, Class III malocclusion was most common among Chinese, similar to the finding by Woon et al. (1989). However, other studies found Class I malocclusion was most common in Chinese (Lew et al. 1993; Zhou et al. 2008). Class II Division 1 was most common in Bumiputera Sabah, similar to the Kadazan Dusun, a study done in Sabah (Wahab et al. 2013).

For skeletal pattern, most patients in our study presented with Class II, similar to a study in Nepal (Halwai et al. 2016). In contrast, a study done in Sabah on Kadazan Dusun found most patients had Class I skeletal pattern (Wahab et al. 2013). However, such finding might be difficult to compare to this study as Bumiputera Sabah consisted of multi-ethnic groups with Kadazan Dusun being one of the main native groups.

In this study, fixed orthodontic appliance was more frequently used compared to other treatment appliances. The advantage of fixed orthodontic appliance is it could correct the malocclusion in various movements, such as tipping, rotation, bodily movement, root torque, intrusion and extrusion. Meanwhile, removable appliance could only do tipping movement for the tooth. Functional appliance is limited for orthodontic growth modification. Orthognathic surgery is indicated to correct severe skeletal discrepancies.

The differences in the malocclusion and skeletal pattern were expected due to the differences in the population, ethnic, and origin. These findings are important for planning of orthodontic services, materials, annual budget, manpower and expertise needs, and future similar researches. Our study had a limitation, as the patients recruited were only from the government orthodontic clinics in East Coast of Sabah. Therefore, the findings might not be representative of the whole population in the East Coast of Sabah. For future similar studies, a prospective, multicentre epidemiological research to review the prevalence of malocclusion and the orthodontic treatment need in Sabah will give a better overview of the pattern of malocclusion in Sabah.

CONCLUSION

Class II Division 1 malocclusion and Class II skeletal pattern were the most common among the patients. Class III malocclusion and Class III skeletal pattern were typical features among the Chinese patients. Fixed orthodontic appliance was the most common treatment method.

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CONFLICT OF INTERESTS

The authors declared no conflict of interests in this research.

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