

Relationship between Type of Patient Motivation and Severity of Orthodontic Treatment Need: A Study in Hat Yai, Songkhla, Thailand

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Abstract

The purpose of this cross-sectional study was to evaluate the characteristics of patients seeking orthodontic treatment and determine the relationship between the type of motivation and the level of orthodontic treatment needed using the Dental Health Component of the Index of Orthodontic Treatment Need (DHC-IOTN). Samples of this study included all consultation records of 2,008 patients from 2014-2017 who were aged over 12 years old for determining the level orthodontic treatment need by DHC-IOTN. Descriptive analysis and chi-square test were used in this study. Results showed most of the samples were female (74.3 %), aged 19-35 years old (47.9 %) with internal motivation (52.0 %). The types of motivation of patients aged 7-12 years old and 19-35 years old were mainly external and internal motivations, respectively. Samples were categorized as “Great need” (DHC grades 4-5) about 50.5 %, while 33.6 % of them were in “No need” (DHC grades 1-2). There was no statistical relationship between patient motivation and orthodontic treatment need level found in this study. So, it can be concluded that female patients sought orthodontic treatment more than males. Late teenage-young adult patients made up the main group of patients seeking orthodontic treatment driven mainly by internal motivation, while most childhood patients were referred from general dentists and due to parental demand. About one third of patients were categorized “No need” for orthodontic treatment and no statistical relationship was found between the type of patient motivations and the severity of orthodontic treatment need.

Keywords: Index of Orthodontic Treatment Need (IOTN), Motivation, Relationship

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Introduction

One of the most important keys for success in orthodontic treatment is motivation¹ which can be separated into internal and external motivations.² Internal motivation

is defined as patient demand³ and influenced by self-perception, facial appearance, and social norms.⁴ On the other hand, external motivation is based on the demands

of the parents or guardians or referrals from general dentists.^{5,6} Presently, the number of patients seeking orthodontic treatment in Thailand is increasing dramatically.^{7,8} These patients may be driven by internal motivation or external motivation or both. However, not all patients who seek orthodontic treatment actually need treatment. There has been no study regarding the relationship between the type of motivation and the level of orthodontic treatment needed.

The patients may have different levels of orthodontic treatment need due to a wide range of characteristics and severities of malocclusion. Assessing orthodontic treatment need is one process that is helpful for determining the need of orthodontic treatment among individuals. Many methods were developed in different countries to categorize the level of orthodontic treatment need. However, the Index of Orthodontic Treatment Need (IOTN)^{9,10} is the most frequently used method.

IOTN was developed in Great Britain in 1989.⁹ It is comprised of two independent components: Aesthetic Component (AC) and Dental Health Component (DHC). The AC determines treatment need by using a 10-grade ranking scale by illustrating different levels of dental attractiveness using color photographs. The DHC is a 5-grade ranking of orthodontic treatment need level. The worst single occlusal trait in five different levels of DHC is used to allocate the grade of IOTN. According to the five levels of DHC, the orthodontic treatment need level can be re-categorized into three levels of need which are comprised of “No need” defined by DHC grades 1-2, “Moderate or borderline need” defined by DHC grade 3, and “Great need” defined by DHC grades 4-5. Studies were conducted using the DHC of the IOTN (DHC-IOTN) as a tool to evaluate orthodontic treatment need in limited sample sizes and specific age groups.^{11,12} The results of those studies demonstrated no relationship between patient demand and orthodontic treatment need.

In Thailand, patients can seek orthodontic treatment from either the private or public sectors for orthodontic services but neither one is financed by the

government or by third party payment. Since the orthodontic treatment fee in the public sector is usually less than the private sector, there is usually a long waiting period for an appointment. The Dental School at Prince of Songkla University is a public sector dental school that provides orthodontic treatment for all age groups. Patients with different motivations have to wait at least two years before orthodontic treatment can be started. To date, no study has considered the characteristics of patients and type of motivation toward orthodontic treatment. Therefore, the purposes of this study were to evaluate the characteristics of patients seeking orthodontic treatment and their motivations regarding age groups as well as the relationship between the type of motivation and the level of orthodontic treatment need level.

Materials and Methods

This cross-sectional study was approved by the Research Ethics Committee, Prince of Songkla University, Thailand. Samples were all the orthodontic consultation records of patients who sought orthodontic treatment from 2014 to 2017 in the Dental School. Patients in all age groups were analyzed for overall characteristics and only patients aged over 12 years old were selected for orthodontic treatment need level assessment due to incomplete occlusal traits data among patients aged 12 years old or under and most of these patients were referred from pedodontists which indicated a certain need for orthodontic treatment. The records with incomplete, illegible or missing data in any variables were excluded from the study. Sample size was estimated by G*Power program for chi-square test with effect size 0.1, $\alpha=0.05$ and power 0.80. The least sample size was 964, then this study used total 2,008 records for samples.

The orthodontic consultation records contained two parts of information. First, general data consisted of age, gender and motivations. Type of motivation was obtained by interviews with orthodontists and recording the information in consultation records. The definition of “Internal motivation” is the patient’s own demand

while “external motivation” is the parents’ or guardians’ demand or referral from general dentists or pedodontists.^{3,5} Patients who sought for orthodontic treatment with both internal and external motivation were excluded from the study because external motivation might result in internal motivation as a consequence and this might interfere with the results of the study. The second part was occlusal traits which would be used for orthodontic treatment need level analysis (5 grades of DHC-IOTN).⁹ According to Lunn’s study in 1993¹⁰, the reliability improvement of orthodontic treatment need level was done by categorizing treatment need into three levels; no need of treatment (DHC 1-2), borderline need of treatment (DHC 3) and great need of treatment (DHC 4-5). Validity of data was assessed by orthodontic experts (not the author) and reliability of the data was done by randomly selected 10 samples in every 50 samples then using Pearson’s correlation for reliability analysis.

Statistical analysis

Pearson’s correlation was used to determine the reliability of data recording. Descriptive statistics such as frequency and percentage were used for demographic variables. The relationship between type of motivation and orthodontic treatment need level of the DHC-IOTN was assessed by Chi-square test with statistical significance set at $p < 0.05$.

Result

From 2,008 records, 241 samples were excluded due to incomplete general data. A total of 1,767 samples were included for characteristic of patients’ study including gender, age of the groups and type of motivation. (table 1) Orthodontic treatment need levels were analyzed by using DHC grading of IOTN in only 1,476 patients aged over 12 years old. (table 2) The reliability presented by Pearson’s correlation of 0.96.

Table 1 Demographic characteristics of samples in all age groups (n=1,767)

Characteristics	Total n (%)
Gender	
Male	454 (25.7)
Female	1,313 (74.3)
Age	
<7	8 (0.5)
7-12	283 (16.0)
13-18	508 (28.7)
19-35	845 (47.9)
36-55	119 (6.7)
>55	4 (0.2)
Type of motivation	
Internal	918 (52.0)
External	292 (16.5)
Internal and external	557 (31.5)

Table 2 Orthodontic treatment need level of samples aged over 12 years old (n=1,476)

Characteristics	Total n (%)
DHC-IOTN	
1	0
2	497 (33.6)
3	235 (15.9)
4	654 (44.4)
5	90 (6.1)
Orthodontic treatment need level	
No need (DHC grade 1-2)	497 (33.6)
Moderate need (DHC grade 3)	235 (15.9)
Great need (DHC grade 4-5)	744 (50.5)

The most frequent degree was DHC grade 4 (44.4 %) followed by grade 2 (33.6 %), 3 (15.9 %), and 5 (6.1 %). Then when considered level of orthodontic treatment need, the results revealed “Great need” group was approximately 50 % of all samples followed by the “No need” and “Moderate need” groups

The results showed that the motivation of patients aged 7-12 years old who sought orthodontic

treatment was predominantly external motivation which decreased with age. However, internal motivation increased dramatically in the adolescent age group

(13-18 years old), hit a peak at 48 % in young adult period (19-35 years old) and then dropped as the participants became older (Fig. 1).

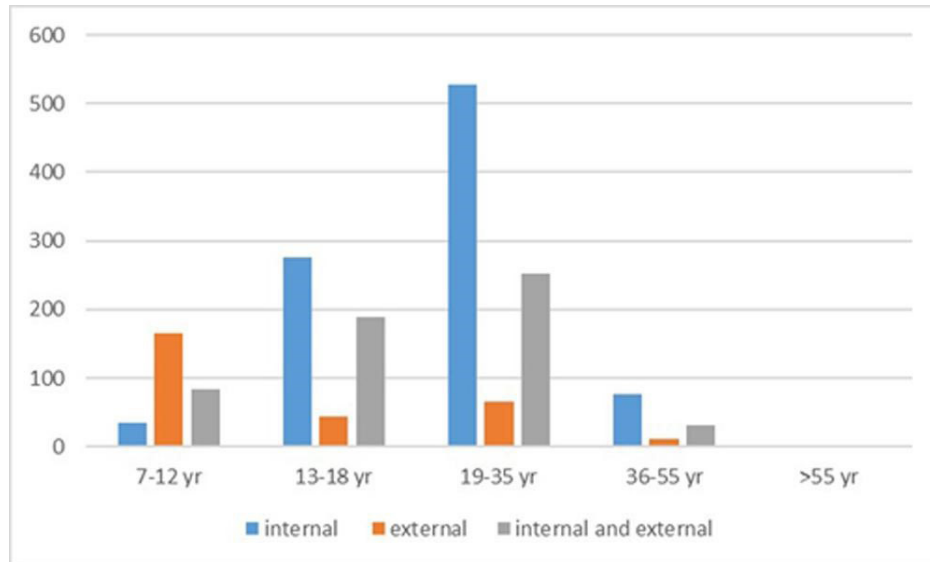


Figure 1 Number of patients regarding type of motivation and age groups

Despite the fact that young patients sought orthodontic treatment mostly because of external motivation and adolescents-young adult patients mostly sought treatment because of internal motivation. After excluded samples in both the external and internal

motivation groups, the results revealed no statistical difference between the level of orthodontic treatment need and the type of motivation (external and internal motivation) (Table 3, $p = 0.114$).

Table 3 Relationship between external and internal motivation and orthodontic treatment need level

Motivation	Orthodontic treatment need level			Total	p-value
	No need (DHC 1-2)	Moderate need (DHC 3)	Great need (DHC 4-5)		
Internal	311 (35.3)	146 (16.6)	424 (48.1)	881 (100)	0.114
External	36 (29.5)	21 (17.2)	65 (53.3)	122 (100)	
Total	347	167	489	1,003	

DHC, Dental Health Component.

Values are presented as number (%).

*Chi-square test, significance at $p < 0.05$.

Discussion

It was found from earlier studies that a large number of patients who sought orthodontic treatment seemed to have little or no need of treatment.^{8,13,14} Moreover, there was no relationship between subjective

motivation by the patients and objective orthodontic treatment need.^{8,12} The Dental School at Prince of Songkla University is one of the main public dental centers in Thailand providing orthodontic treatment for all age groups

and there are no earlier studies about orthodontic treatment need level among patients seeking for orthodontic treatment. Therefore, it is beneficial to know the patient's type of motivation, orthodontic treatment need level, and their relationship. This would be beneficial to improve the screening system, staff management, and policy development in this and other public sector dental schools. In addition, this is the first study in Thailand with a large sample size to consider these aspects.

The limitations of this study were mainly about using retrospective secondary data and being conducted in a single-center institute. Samples of orthodontic records consisted only of age, gender, chief complaint, motivation and occlusal traits related to orthodontic treatment. So, uncontrollable confounding factors such as socio-economic background, education and even age and gender were concern.^{15,16} Moreover, generalization of this single-center study was considered as a limitation as well. According to a previous study, there was a rising trend in male patients seeking orthodontic treatment by using a time series analysis.¹⁷ However, in this study the results found that the number of female patients who sought orthodontic treatment was greater than male patients (70:30). This corresponded with earlier studies^{13,18-21} that reported that women had a greater interest in getting orthodontic treatment than men. Late teenage and young adult patients (19-35 years old) were the most dominant age group seeking orthodontic treatment in this study which harmonized with an earlier study²⁰ that revealed that middle-aged patients had a relatively high interest in orthodontic treatment. The major reason may be driven by esthetic concerns^{4,22} as well as the impact of malocclusion on the quality of life.²³ Furthermore, this age group of patients were able to afford the orthodontic treatment fees on their own.

Even though some studies^{20,24} in Asian countries recently found a large number of adult patients with a high interest in getting orthodontic treatment, this study showed less than 10 % of the adult patients aged >36 years sought orthodontic treatment. Earlier studies^{18,25} found that older patients were less concerned about

their facial appearance and had less desire for orthodontic treatment. The main reason for adult patients not to seek and receive treatment were primarily the treatment fees, long treatment time, and they felt too old for braces.²⁰

This study demonstrated that over 50 % of patients who sought orthodontic treatment were driven by internal motivation which reflected the current perceptions of esthetic and functional concerns. However, when considering the age groups, external motivation was predominant in childhood patients aged <12 years. This finding was related to studies which indicated that parents have recently placed more attention on the oral health and malocclusion of their children.^{1,5,26-28} Suggestions for orthodontic treatment from general practitioners and pedodontists outside and inside this dental school could also be the external motivations for this group of patients.^{29,30} This study found that almost 35 % of the patients who sought orthodontic treatment in this practice had no need of treatment (DHC grade 2). This finding was remarkably interesting as it reflected proper orthodontic treatment management.³¹ Patients with great need should receive orthodontic treatment as soon as possible. Therefore, an objective grading for orthodontic treatment need level among patients is beneficial when there is an insufficient number of orthodontists to meet the requests for treatment.

According to patients with both internal and external motivation there could be a blurred relationship between the type of motivation and the level of orthodontic treatment. The objective of this study would focus only a relationship between the type of motivation (external and internal) and level of orthodontic treatment. The results indicated no relationship between those variables. Therefore, it cannot be concluded that patients with external motivation who are influenced by parents or dentists had a higher level of orthodontic treatment need than patients with internal motivation and vice versa. It is important to consider an orthodontic treatment need index or an objective criteria as a tool to identify and prioritize the level of orthodontic treatment need among patients seeking for orthodontic treatment.

Since malocclusion is a normal deviation and not a pathologic condition, late teenage and young adult patients who have a great demand for orthodontic treatment should be fully informed about any existing malocclusion for a clear understanding. Among the patients with false needs and no need of treatment, it is the responsibility of the orthodontists to provide scientific knowledge on the risks and benefits regarding orthodontic treatment.

Conclusion

- Female and late teenage-young adult patients were the major group of patients seeking orthodontic treatment at the Dental School, Prince of Songkla University.
- Late teenage and young adult patients seeking orthodontic treatment were driven mainly by internal motivation, while the majority of childhood patients were driven by external motivation and mostly referred from general dentists and request of the parents.
- About one third of patients seeking orthodontic treatment were categorized as “No need” for treatment.
- No statistical relationship was found between the type of patient motivation and the level or severity of orthodontic treatment needed using the DHC-IOTN.

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