

Factors that influence perceptions of orthodontic treatment need. Literature Review

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العوامل التي تؤثر على الوعي لحاجة علاج تقويم الأسنان كثيرة. الهدف: معرفة وتلخيص هذه العوامل من خلال مراجعة الأبحاث المنشورة. طريقة الدراسة: تم عمل بحث إلكتروني في قاعدة البيانات (Pubmed) للأبحاث المنشورة إلى عام ٢٠٠٦ في موضوع الوعي لحاجة علاج تقويم الأسنان. النتائج: تم العثور على أكثر من ١٤٠ بحث متعلقة بالموضوع نفسه. كما وجد أن العوامل المهمة والمؤثرة هي العمر والجنس ومعيار الحياة. الاستنتاج: الوعي لحاجة علاج تقويم الأسنان في المجتمع معقدة لذلك يجب على الطبيب المعالج معرفة السبب الرئيسي لطلب علاج التقويم لكل مريض على حدة قبل البدء بالعلاج.

Factors that affect the perception of orthodontic treatment need are many. **AIM:** To identify and summarize these factors through a literature review. **METHODS:** Electronic databases such as Pubmed were searched for all papers up to 2006 which addressed the perception of orthodontic treatment need. **RESULTS:** We identified more than 140 papers that were relevant to our topic. We found that the important factors affecting the perception of orthodontic treatment need were age, gender, and norm. **CONCLUSION:** The perception of the orthodontic treatment need among the public is complex, therefore clinicians should know the main reason for having orthodontic treatment among the patients individually before commencing the treatment.

INTRODUCTION

Orthodontic treatment involves the correction of malocclusion¹ with the aim of enhancing dental health and function.² Malocclusion is largely determined by genetic factors³ and dental appearance has been suggested to be the main motivating factor for orthodontic treatment.⁴ In addition, the demand for orthodontic treatment will increase as the standards of living of a society increase.⁵ Knowledge of the public's attitude towards orthodontic treatment is important, because it facilitates the management of human resources and assists the orthodontists in meeting their patients' expectations.

Almost all the studies that have been involved in demand for orthodontic treatment confirm that the primary concern of patients was dental aesthetics. This makes the quantification of

malocclusion in the community extremely difficult.¹ However, a social norm has major influence for the decision to undergo orthodontic treatment.⁶

Orthodontic literature contains extensive studies of orthodontic treatment need which represented the objective views of the profession itself using indices. Unfortunately, little attention was paid to the needs of the community in terms of orthodontic treatment.⁷ The most commonly used type of need assessment in dental health planning is normative need. Therefore, the majority of techniques for measuring orthodontic treatment need were based on clinical examination alone.⁸ In addition, the variables that could influence orthodontic treatment demand amongst the public are numerous and no studies have succeeded in demonstrating them reliably for orthodontic treatment.⁹

The factors that are involved in the perceived need of orthodontic treatment are many. The aim of this paper was to identify and summarize the factors

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that affect the perception of orthodontic treatment needs through a literature review.

METHOD

An extensive literature review was done through an electronic English language publications database search. Databases searched included PubMed, with keywords included but not limited to the following: orthodontic treatment, orthodontic treatment need and perceived need of orthodontic treatment. We limited our search to English language articles published prior to June 2006. Identified relevant papers were reviewed by the primary investigator (an orthodontist), and information extracted included findings, recommendations and conclusions. Since this was not intended as a meta-analysis, findings were summarized in a qualitative form.

RESULTS

The term "need" has been generally used in the literature and was first defined by Bradshaw.¹⁰ This definition will be used in this paper for the purpose of describing the need for orthodontic treatment. Need could be divided into three categories: normative, perceived and expressed. "Normative Need" is based on an expert or professional definition in any given situation. "Perceived Need" is defined as the individual's own assessment of his or her own requirement for health care. Finally, "Expressed Need" is that which is converted into action by seeking assistance.

Through our search, we were able to identify more than 140 papers that were relevant to perceptions of orthodontic treatment need. In Table 1, we summarized our findings according to Bradshaw's method.

Table 1. Orthodontic treatment need factors

Type of need	Factors
Normative need	Dentist's awareness Indices
Perceived need	Accuracy of occlusion rating
	Reasons for perceived benefits of orthodontic treatment
	- Risks and benefits of orthodontic treatment
	- Discrimination
	- Teasing and harassment
	- Media
	- Parents
	- Peers
	- Social status
	- Ethnicity and demographic areas
	- Self-esteem
	- Better occupation
	- Dental appearance
- Facial appearance	
- Function (mastication, TMD, speech)	
- Gender	
- Age	
Expressed need	Availability of the service Payment method

NORMATIVE NEED

Dentist's Awareness

The general dentist and orthodontists are more aware of the malocclusions than the parents.¹¹ Therefore, the dental profession plays a major role in the initiation of orthodontic treatment.¹²⁻¹⁴ Furthermore, this phenomenon is reinforced by the public who trust the professionals in the decision regarding orthodontic management.¹⁵ However, the perception of orthodontic need among the public is quite different from the normative need.^{16,17}

Indices

Indices allow a selective distribution of the national resources and protect the patients from the potential risk of damage.² Indices of orthodontics have been developed to measure the malocclusion in

terms of anatomy, function, aesthetics or biometric standards which are meaningful to the orthodontic profession¹. However, there are numerous indices that have been suggested in an attempt to categorise malocclusions into groups according to the level of treatment need such as Treatment Priority Index (TPI) which was developed by Grainger.¹⁸ It scores various components of malocclusion: molar relation, overjet, overbite/openbite, crowding / rotations, missing teeth and crossbites (i.e. 6 characteristics). A final score from 0-10 is obtained and categorised according to the need. Another, Occlusal Index (OI) developed by Summers.¹⁹ It is similar to the TPI, but is more complex. A third index is Handicapping Malocclusion Assessment Record (HMAR) which was developed by Salzmann²⁰ which is simple and reproducible and needs only mouth mirror and probe and can be performed at the chair side or using a study model. Another index is the Peer Assessment Rating (PAR) developed by Richmond *et al.*²¹ This index is used for the assessment of the success of treatment and retrospectively could be used to justify the need for orthodontic treatment. The Index of Orthodontic Treatment Need (IOTN) was developed by Brook and Shaw²² to justify orthodontic treatment needs on either aesthetic or dental health needs. Index of Complexity Outcome and Need (ICON) which was developed by Daniels and Richmond²³ to determine who is best to treat a particular case as based on training term (e.g. general dental practitioner, specialist or consultant).

There are some indices that were developed to assess the aesthetic concerns of the lay public. The Dental Aesthetic Index (DAI), the Socially Acceptable Scale of Occlusal Conditions (SASOC) and the Aesthetic Component (AC) of the Index of Orthodontic Treatment Need are examples of such indices.

PERCEIVED NEED

Accuracy of Occlusion Rating

The individual's perception of dental appearance is complex. For example, Shaw *et al.*²⁴ found that Class III malocclusions were quite acceptable to the lay public whereas Class II Division 1 malocclusions were not. Children and parents fail to accurately describe and identify their malocclusions.²⁵ However, this finding should not be interpreted to state that children and parents have no perception of their malocclusion, since they are concerned about dental alignment and it is difficult for them to describe the malocclusion precisely. In addition, individuals with low self-esteem underscore their dental attractiveness.²⁶ Furthermore, some patients with a great need for orthodontic treatment do not express orthodontic concern, whereas others with near ideal occlusions express concern and desire for treatment.^{27,28}

REASONS FOR PERCEIVED BENEFITS OF ORTHODONTIC TREATMENT

Risks and Benefits of Orthodontic Treatment

There is a lack of awareness about orthodontic treatment among parents and their children.²⁹ However, parents are more aware of the benefits of the treatment than the risks.³⁰

Discrimination

Crowding or spaces of the anterior teeth maybe associated with negative attributions about intelligence, beauty and sexual attractiveness.³¹ However, teachers do not discriminate amongst their students, because of dental features.³² In addition, there is no significant difference

in the job status between groups of treated and untreated individuals.³³

Teasing and Harassment

Teasing concerning the malocclusion could cause considerable upset to the child involved³⁴ and such occurrence could affect the quality of life in adulthood.³⁵ Teasing about weight, height and hair are more common than the occlusion, and considerably higher among 9 and 10 years old who report harassment as compared to 12 and 13 years old children, with girls and boys being equal victims.³⁴

Media

Media has an influence on children in terms of appearance.^{36,37} Therefore, since the majority of the models have a better smile,³⁸ it was not surprising to have some children who sought orthodontic treatment due to media influences.³⁹

Parents

Parents demand for orthodontic treatment for their children because of their perception that straightening of teeth is important for appearance, social status and improved job opportunities.^{27,40} Parents who desire orthodontic treatment for themselves or who had orthodontic treatment are more likely to seek orthodontic care for their children.⁴¹

Peers

Peers have a greater influence on accepting orthodontic treatment than the subject's social class or gender.⁴² This finding coincided with another study involving attitudes towards fixed appliance in third-grade schoolchildren in the USA.⁴³

Social Status

The need for orthodontic treatment as perceived by lay public depends upon the social norms for appearance and other psychological factors.⁷ A study was conducted by Trulsson *et al.*⁶ in Sweden showed that the decision to undergo orthodontic treatment was based on a massive external influence. Kerosuo *et al.*³¹ suggest that the demand for orthodontic treatment for aesthetic reasons may not be mere vanity, but rather a valid intuition of social response and evaluation. It has been found that orthodontic treatment is much more frequent in higher income groups.^{3,44} Kenealy *et al.*⁴⁵ suggested three possible explanations for this finding. The first was that middle class children attended routine dental examinations more regularly and therefore borderline indications for orthodontic management were more likely to receive treatment. This suggestion has some similarities to that found by Bergstrom *et al.*⁴⁶ that there was a greater degree of tolerance towards malocclusion in individuals residing in rural areas than those in urban areas. The second possible explanation was that middle class parents had a higher perception and awareness of well aligned teeth, and the third possibility concerned the awareness of the general dental practitioner towards the malocclusions. Conversely, Kenealy *et al.*⁴⁵ and O'Brien *et al.*⁴⁷ found that social class had virtually no effect on orthodontic treatment demand when the subjects considered had substantial visible dental irregularities.

Ethnicity and Demographic Areas

The demand for orthodontic treatment was found to be affected by demographic areas.⁴⁸⁻⁵¹ However, ethnicity may affect the perceived need for orthodontic treatment.^{52,53}

Self-esteem

There is a positive relationship between the malocclusion and self-esteem,^{16,33,54} and subjects who underrate their dental attractiveness, on average, have lower self-esteem.^{2,26,55} There is no significant difference between the new orthodontic and of retention groups in comparison between body-image and self-concept.⁵⁶ Although Lew⁵⁷ found that after two weeks of debonding an improvement in dental facial aesthetics following orthodontic treatment may enhance patients' self-esteem. Low self-esteem is likely to persist following the improvement in dental and facial aesthetics,⁵⁸ and therefore discourage the orthodontic treatment where the risk of damage is more than the benefit.²

Better Occupation

The belief that orthodontic treatment enhances dental appearance and will therefore lead to better occupational opportunities has been associated with an increase in orthodontic treatment demand.^{2,59} It was found that 75% of parents felt that orthodontic treatment was important for success in their children's future occupation and 92% believed that it would enhance dental health,¹² therefore it is advisable for clinician to understand the reasons for having orthodontic treatment from their patients.⁵⁴

Dental Appearance

There is no doubt that enhancing dental and facial appearance is the most important factor in orthodontic treatment demand among public.^{2,4,7,15} Therefore, it is not surprising that 75% of patients seek orthodontic treatment to improve their dental appearance,¹⁴ and the percentage reached 98% in another study.⁶⁰ However, the perception of orthodontists and

general dentists is more conservative as compared to the patients.⁶¹

Facial Appearance

Patients seek orthognathic surgery to improve dental appearance and prevent future dental problems.⁶² There is a difference in ranking the facial profile between the professional and lay people,^{11,63,64} therefore, clinicians and patients should plan together for the treatment.⁶⁵

Orthognathic may result in psycho-esthetic benefit to the patients.⁶⁶ However, patients with poor self-concept may report dissatisfaction with their facial appearance after orthognathic surgery. Therefore, orthodontists may need to give attention to those types of patients.⁶⁷

FUNCTION

Mastication

An increased overjet and an anterior openbite may cause unsatisfactory mastication, and crossbite may associate with speech disorders. Unilateral crossbite may also be associated with locking of the mandible.³³ However, majority of orthodontic treatment is carried out in children whose malocclusions are unlikely to produce functional deficits.⁵⁸ In addition, a substantial proportion of the lay public expect functional improvement such as chewing and speaking after orthodontic treatment.^{12,56} These reasons may explain why there is less research literature with regard to function as compared to dental aesthetics.

Temporomandibular Joint Dysfunction (TMD)

It has been found that the malocclusions are not major cause for development of TMD, but occlusal interferences may

be risk factor.⁶⁸ In fact, the aetiology of TMD is unknown,⁶⁹ therefore a phrase "multifactorial" aetiology has often been used.⁷⁰ Adult patients with TMD may seek orthodontic treatment hoping for relief of their symptoms. Since orthodontic treatment is neither a major preventive nor a significant cause of TMD,⁷¹ it is important to advise patients with TMD that orthodontic treatment may not cure their symptoms.⁷²

Speech

Speech disorders have been reported as a reason for seeking orthodontic treatment,^{15,73} although there is no close relationship between speech disorders and malocclusions.⁷⁴

Gender

Females are frequently less satisfied with their dental appearance,⁷⁵ body image,⁵⁷ and have higher interest in physical attractiveness than males.⁷⁶ In addition, social and appearance values are more important to women than men.⁵⁹ Therefore, they receive more treatment than males,^{77,68} although the gender has a little correlation with malocclusions.⁷⁸ However, most of the parents perceive dental aesthetics to be equally important for girls and boys.^{27,79}

Age

The awareness of malocclusion increase with age and reaches the peak around the mid-teens,² and then the concern of malocclusion decreases with age.⁸⁰ Some adults feel embarrassed wearing braces or they are unaware of orthodontic management of malocclusion in adults.⁵⁶ But, it may be important to mention that of most of the studies involved in orthodontic treatment demand included dental appearance more than functional

aspects. In contrast, however Coyne *et al.*¹ found that perceived need and demand for orthodontic treatment was highest in the 40-54 years old. The number of adult patients increases from 5% to 24%.³ This is probably as a result of increased dental and orthodontic awareness⁷² an increased social acceptability for appliance therapy,⁸¹ and dissatisfaction with the outcome of previous orthodontic treatment.⁸² In addition, adults adapt psychologically to fixed appliance more easily than adolescents.⁷²

EXPRESSED NEED

Availability of the Service

The resources available for orthodontic treatment are related to the influences of the dental professions and the availability of the services and cultural attitudes.⁸³ It has been hypothesized that the greater the availability of treatment the greater the demand.^{84,85} In contrast, Tulloch *et al.*¹⁵ did not confirm this hypothesis among British and American children. This may be related to different norms which have an effect on the acceptance of the treatment.⁸⁵

Payment Methods

Dental treatment cost is either free or partly funded by state or private insurance. Therefore, if it is not free, orthodontic treatment will depend upon the patient's willingness to pay for the cost of the treatment.

CONCLUSION

We could summarize our findings in Table 2. However, we could conclude from this literature review the following: age, gender and norm are important factors in the decision to receive orthodontic

treatment, therefore, they need to be considered in the initial examination. Since the perception of the malocclusion of the patients is quite different from the professionals, it is advisable to communicate with each patient before commencing or refusing orthodontic treatment.

Table 2. Orthodontic treatment need factors and their effect

Factor	Effect
Dentist awareness	Positive
Indices	Positive, the higher index the more treatment need
Accuracy of occlusion rating	Not clear
Risks and benefits of orthodontic treatment	Positive
Discrimination	No association
Teasing and harassment	Positive
Media	Positive
Parents	Positive
Peers	Positive
Social status	Positive
Ethnicity and demographic areas	Positive
Self-esteem	Positive
Better occupation	Positive
Dental appearance	Positive
Facial appearance	Positive
Mastication	Positive
Temporomandibular Joint Dysfunction (TMD)	Positive
Speech	Positive
Gender	Female demands more than male
Age	Positive
Availability of the service	Greater the availability of treatment the greater the demand
Payment methods	Positive

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