

The relation between american board of orthodontics' literature review examples

[Health & Medicine](#), [Nursing](#)



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Discrepancy Index and treatment time

Introduction

During the past many decades, considerable efforts have been made to develop reliable and standardized measurement tools in orthodontics.

Quantitative indices like the peer assessment rating (PAR) and the objective grading system (OGS) have been successfully used so far to assess outcomes of an orthodontic treatment, but these are limited to occlusal aspects only (Cangialosi, 2004).

ABO's DI

The American Board of Orthodontics' (ABO's) main goal is clinical excellence as it aims to deliver high quality orthodontics. With this goal in mind, it has devised a tool, the Discrepancy Index (DI) with an intention of providing an objective evaluation of case difficulty that is anticipated to lead to a better understanding of the complexity of an orthodontic case. Difficulty in treating a case can be subjective, but the complexity is quantifiable, if measured by

severity and number of factors, varying from normal. Case complexity is defined as “ a combination of factors, symptoms, or signs of a disease or disorder, which forms a syndrome” (Cangialosi, 2004). Case complexity is a criterion for understanding the acceptability of a case submitted for ABO Phase III clinical examination. Thus, DI is an objective way of describing the complexity or difficulty of a treatment plan for an orthodontic patient based on clinical findings and measurements recorded from cephalometric and panoramic radiographs and casts (Cangialosi, 2004). Another objective of DI was to create a supplement for the ABO case category requirements, but not necessarily to entirely replace them (Cangialosi, 2004). With this, there is a possibility to offer a wider basis to qualify cases for the Phase III clinical examination of the ABO. Categories of cases were created to benchmark and measure certain treatment skills and establish target disorder baselines, which are typically the clinical challenges faced by many orthodontist. Thus, the DI method of analysing a case is the ABO’s current approach to summarizing the clinical findings of a patient’s disorder with an objective and quantifiable list of target conditions that represent common issues related to a diagnosis of an orthodontic condition (Cangialosi, 2004). The DI measurements can be done relatively in a simpler manner and even speedily. The clinical findings or clinical entities of a patient can be overjet, overbite, occlusion, crowding, anterior open bite, lingual posterior crossbite, lateral open bite, and ANB angle. These elements objectively describe a malocclusion (Cangialosi, 2004).

Factors affecting treatment time

A common question in the mind of every patient undergoing an orthodontic treatment is “ How long do I have to wear my braces?” Therefore, for an orthodontist, a larger understanding of the factors that influence treatment time is essential.

A relatively recent study by Skidmore and colleagues identified factors that influence orthodontic treatment. The study showed that on an average, the treatment time from initiation to completion of an orthodontic treatment was 23. 5 months (range, 12-37; SD, 4. 7). Treatment time for male patients was 1. 2 months longer than female patients (Skidmore, 2006). Crowding in any of the arches of 3 mm or more was significantly associated with an increased treatment time. An ANB angle that was greater than 6 degrees or an overbite greater than 5 mm increased treatment time by 1. 3 months and 1. 2 months respectively (Skidmore, 2006). Class II molar relationship patients had mean treatment times that were longer by 2. 6 months. Applying bands on maxillary second molars while undergoing treatment and within the first one year of treatment reduced mean treatment time by almost 2 months (Skidmore, 2006). If tooth/teeth extractions were required, it resulted in 3. 3 month increase in treatment period. Treatment time increased with maintenance of poor oral hygiene, elastic wear, total number of treatment visits, and failed appointments (Skidmore, 2006).

An old study by Beckwith and colleagues also identified some factors that influenced orthodontic treatment time. The average treatment time in this study was 28. 6 months. The number of failed appointments, number of treatment phases, number of replaced brackets and bands, poor oral

hygiene, and need of wearing headgear during treatment all contributed to the variation in treatment time (Beckwith, 1999).

Many other studies assessed the variation in treatment time of potential explanatory variables like number of phases of treatment, number of failed appointments, use of headgear, oral hygiene maintenance, number of extractions, peer assessment rating (PAR) score, crowding, type of appliances, sex of the patient, age of the patient, Angle's classification, missing teeth, impacted teeth, cephalometric measurements, total number of office visits, number of broken appliances, overjet and overbite before initiating treatment, and the time between appointments (Popowich, 2005 & Skidmore, 2006 & Mascarenhas, 2002 & Stewart, 2001).

A latest study by Fisher and colleagues estimated which orthodontic patients were more likely to require a shorter time and which patients were likely to require a longer time, before beginning a treatment. The results showed that patients who do not need extractions as part of treatment, patients who did not have deciduous dentition, patients who had less than 80% overbite, patients who had less than 6 mm of crowding of maxillary dentition, and those who practised good oral hygiene were 2 to 3 times more likely to have short treatments (Fisher, 2010). On the contrary, patients who had decreased lower facial height, patients who needed extractions as part of treatment, presence of primary teeth, poor oral hygiene, excessive overjet or overbite, and 6 mm or more of maxillary crowding were 2 to 3 times more likely to have longer duration of treatments (Fisher, 2010).

A systematic review by Mavreas and Athanasiou revealed similar results. In addition to all factors discussed above, the systematic review added a few

more revelations with respect to the duration of orthodontic treatment such as - valid conclusions regarding orthodontic treatment with a removable appliance cannot be drawn, age differences do not play a role in increasing or reducing treatment durations as long as the patient is in permanent dentition, variable treatment duration in combined orthodontic-surgical cases is highly operative sensitive, and availability of limited data to prove self-ligation - all these can lead to a shorter duration of treatment. There is also contradictory information in the literature regarding treatment duration within public health systems (Mavreas, 2008).

The difficulty of achieving the treatment result as an ideal or normal occlusion might lie factors like pre-treatment occlusion, patient associated factors, and the treatment itself. A study by Louwarse and colleagues identified factors that were related to the dentist's post treatment categorization of a case as difficult case or an easy one. After assessment of 10 easy cases and 10 difficult cases by 10 orthodontists, it was seen that difficult cases had greater severity and need before treatment and also greater residual malocclusion and need after treatment (Louwarse, 2006). Difficult cases had poor oral hygiene and a poor compliance along with increased number of extractions and changes in treatment plan. In addition, difficult cases required more number of appointments and a longer treatment time. These factors actually define a case as a difficult case or an easy case for an orthodontist (Louwarse, 2006).

Relation between ABODI score and treatment time

On - time completion of an orthodontic treatment is something which the patient always looks forward to. Besides, the treating orthodontist's ability to correctly predict treatment duration is an essential clinical practice-management skill.

In a study by Vu and colleagues, factors affecting orthodontic treatment duration were assessed with the use of ABO's DI to evaluate the severity of pre - treatment malocclusion. TCI (treatment complexity index) was used to evaluate case complexity based on treatment modalities. IUSD's comprehensive clinical assessment (CCA) and ABO's OGS (objective grading system) were used to evaluate clinical outcomes for the patients undergoing the orthodontic treatment (Vu, 2008). In the study, the average treatment duration was seen to be 29 months with mean OGS, DI, and CCA scores at 23. 34, 4. 48, and 15. 30 respectively. In the study, DI score was used as an indicator of the severity of malocclusion before initiating treatment and increasing case complexity. For every 1 unit increase in the DI score, the treatment time increased by 0. 1month. Thus, this study proved DI to be a sensitive prospective indicator of treatment time (Vu, 2008).

A study by Deguchi and colleagues assessed different orthodontic measurement tools such as pre - treatment difficulty by PAR and DI index, and post treatment quality by OGS, CCA, and PAR in analysing the treatment outcomes between patients of Okayama University and Indiana University. Therefore, the study also identified specific problems in treating Asian orthodontic patients (Deguchi, 2005). For Asian patients, the mandibular plane angle should be modified when scoring severity of malocclusion with

the help of DI. Thus, evaluation of the pre-treatment records by DI indicated that as compared to whites, more arch length discrepancy and steeper mandibular plane angles were the characteristics of Asian patients (Deguchi, 2005). In this study, evaluation of the difficulty of malocclusion was done both by PAR and the DI. Correlation between DI (with cephalometric values) and PAR was not found to be statistically significant. When cephalometric values were deleted, there was a statistically significant correlation between the PAR weighted scores and the DI. Thus, the study showed both PAR and a modified DI to be useful indexes for evaluating the case complexity, but the reliable use of the DI requires the introduction of race-specific cephalometric standards or the development of a weighting system (Deguchi, 2005).

Simister's study showed that a DI of at least 15 points would predict treatment duration time longer than 22.1 months, approximately 85% of the time. This is of great value when the aim is to help predict the length of treatment time. The author suggests that the DI is relatively easy to measure and requires nothing more than models and a cephalometric radiograph. Thus, it can be used as an aid when treatment time is required to be predicted. (Simister, 2007)

A study published in 2006 by Campbell and colleagues intended to focus on challenging malocclusions that followed to the case categories defined by ABO. The objective was also to see if some categories of ABO inherently included more complex cases of malocclusions that are not easier to finish to the desired ideal result (Campbell, 2007). It was seen that, generally, the cases that fit categories had higher OGS, CCA, and DI scores than some other cases. DI scores were significantly higher than average for cases of

posterior crossbite, anteroposterior discrepancy, and Class II, Division I malocclusion. Those patients whose treatment was initiated early tended to have longer treatment times and they had the lowest DI average scores, but this was because the treatment initiated in the mixed dentition was continued in the permanent dentition or the treatment was offered again after the permanent dentition had erupted (Campbell, 2007). Although the study showed that the CCA and OGS scores were positively correlated with the DI score for all patients studied, there was no significant difference observed in the outcomes of the treatment in specific ABO case categories (Campbell, 2007).

Lastly, a very recent review on 732 patient records by Parrish and colleagues tested the hypothesis that there is no relationship between DI and treatment time, only for the hypothesis to be rejected. This retrospective study showed that there was an average increase of about 11 days in treatment duration for each point increase in total DI score, therefore an increase in DI score by 10 point will increase treatment time by 110 days on an average. Though the intention of ABO to construct DI was for measurement of “ case complexity”, this study proved that it is of value in predicting the treatment duration, which is a factor beyond its original intention of case complexity (Parrish, 2011).

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