BACKGROUND

Orthodontic case complexity has routinely been measured subjectively by individual practitioners to determine the approximate length of orthodontic treatment time. The perceived treatment difficulties were usually classified as easy, moderately difficult, and difficult. Over the years, quantifiable indices like Grane's Treatment Priority Index (TP) (Prollini 2001), the Index of Complexity, Outcome and Need (ICON), and Index of Treatment Need (ITN), have been developed primarily to assess treatment complexity and need. They are, however, not particularly good predictors of treatment difficulty (Richmond 2001).

In 1988, in an effort to quantify the level of treatment complexity, the ABO developed a Discrepancy Index. Unlike the previous indices, ABO’s purpose was not to determine treatment need but to develop a method to assist the orthodontist in selecting cases for the Phase III Board Examination. Since 1988, the DI has been field-tested and modified. The DI is now one of the criteria used to determine the acceptability of an orthodontic case for the ABO Phase III Clinical Examination. The case categories were created to help establish baselines for case presentations and to measure specific treatment skills that are typical clinical challenges encountered by orthodontists (ABO-JO 2004). The DI is built on several observations and measurements taken from standard pretreatment orthodontic records, including study casts and cephalometric and panoramic radiographs.

PURPOSE AND HYPOTHESIS

The purpose of this study was to determine whether there is a correlation between the ABO Discrepancy Index (DI) and the length of orthodontic treatment in relation to:

Case Severity— DI scores are within a particular range (i.e. 5-9, 10-14, 15-19, 20-24, etc.)

Case Type— dental and skeletal discrepancies with the same DI scores.

In addition, the study examined the variables that affect this correlation.

Since the DI is a quantifiable measurement, it is hypothesized that it can be used to predict the length of time for orthodontic treatment. This will help orthodontists give patients a better idea of treatment time and provide a guide for the orthodontist to assess the treatment progress, leading to an improvement in the long-term productivity of the practice. In addition, completing treatment within the predicted time frame will result in more satisfied patients.

MATERIALS AND METHODS

Recently Board Certified orthodontists were asked to submit three to ten orthodontic Board cases for the study. These recent ABO cases were by definition, all scored on the DI and completed to the ABO standard of quality. The orthodontists were required to complete a questionnaire for each case which included the following information: type of discrepancy, DI, length of orthodontic treatment, patient’s age, gender and race, treatment plans of extraction vs. non-extraction, use of functional appliances in conjunction with fixed, non-compliance (number of missed appointments, number of broken appliances, etc.), total number of appointments, and average appointment interval.

RESULTS

Data were collected on 90 cases (from 13 treating orthodontists) with DI scores ranging from 6-61 and orthodontic treatment duration ranging from 14-47 months. To evaluate the strength and direction of the relationship between the DI and duration of treatment, a Pearson correlation, scatter gramm and ANOVA were used. Pearson’s r was 0.256 and a sig. of .015 indicated that although the correlation was significant at the .05 level, it was a weak correlation. This relationship was also presented graphically in the form of scattergram with DI as an independent variable and time as a dependent variable. The pattern showed an upward trend. This indicated that there was a weak but positive correlation. ANOVA with sig. of .107 (P<.05) confirmed the weak correlation.

When comparing cases with the same DI values, the variables which accounted for a substantial portion of the variation in treatment time are: the use of functional appliance in addition to fixed appliance, vertical discrepancy of deep bite or open bite, constitution of the maxilla in the transverse relationship, A-P (anteroposterior) discrepancy of Class II div 1, Class II div 2, and Class III, treatment plan involved extraction, age (i.e. older patients vs. adolescents), especially cases with ectopic eruption, impaction, anomaly of tooth size, and dental midline discrepancy. Perhaps the most significant variable is patient non-compliance.

The types of discrepancy which tend to have higher DI scores are cases with Class II div 1 or deep bite, and cases with an open bite. Our findings indicate that, although cases with an open bite trend to have higher DI scores than deep bite cases, their treatment lengths are comparable.

DISCUSSION / CONCLUSION

Although the DI score is used to measure orthodontic case complexity, it cannot be used to predict the orthodontic treatment time. The results clearly demonstrated that the DI scoring does not reflect the severity of the case type or case complexity. For instance, a case with complete canine impaction is assigned a DI score of only 2 points, while a case with an anterior open bite of 1mm from canine to canine is assigned a DI score of 12 points. Most orthodontists would agree that a case with canine impaction requires longer treatment time than a case requiring correction of a minor open bite. Logically, the DI should be higher for the canine case.

Further development of the Discrepancy Index is required in order for it to be able to reliably measure the complexity and treatment time of orthodontic cases.

BIBLIOGRAPHY


