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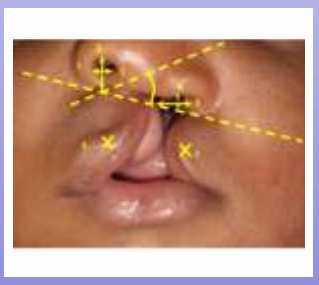
PAR and self reported improvement of malocclusion



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Peer Assessment Rating (PAR) and Self-reported Improvement of Malocclusion among Patients Treated by Orthodontic Residents in Ibadan

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Abstract

Background: Orthodontic treatment brings about an improvement in occlusal features, facial aesthetics, and function. The Peer Assessment Rating (PAR index) quantitatively measures the degree of improvement in the presenting malocclusion following orthodontic treatment as well success of treatment. The aim of this study was to evaluate treatment outcome of patients seen in the orthodontic clinic in U.C.H Ibadan and to compare this with patients' self-reported improvement.

Methods: Study models of the first ten cases treated to the expected standards of an accredited examination body for orthodontic training, by 5 senior registrars were selected. The study models were of patients treated using fixed appliance therapy. Fifty pre and post treatment study models were thus obtained and assessed using the PAR index. Furthermore, the same patients were recalled to assess their self-perceived improvement in their malocclusion using a Likert scale. The data obtained was analyzed using SPSS version 23.0. Variables such as age at start of treatment and treatment duration were also analyzed.

Results: Nineteen (38%) males and 31(62%) females participated in the study. Their ages ranged from 11-26 years with a mean age of 15.7±4.47. The mean pre-treatment PAR index was 17.96 ±8.11 and the post treatment PAR index was 4.20 ±4.43. The mean percentage reduction in PAR index is 74.87±25.46. Majority (58%) of the cases showed a PAR reduction of great improvement, while 52% of the patients reported great improvement as the self-perceived outcome of the treatment of their presenting malocclusion.

Conclusion: Patients who had orthodontic treatment as standardized by an accredited examination body for residency training in U.C.H Ibadan showed great improvement in their presenting malocclusion using PAR index, also the patients' self-perception of their treatment outcome was of great improvement.

Keywords: PAR, Self-reported Improvement in Malocclusion Orthodontic residents.

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ORIGINAL ARTICLE

Introduction

Regular evaluation of treatment outcomes in an orthodontic clinic provides a means for orthodontists to appraise their results, strive to improve treatment outcomes, set clear objectives and encourage high treatment standards in the orthodontic profession.[1,2] It is a useful guide on policy design and implementation, especially in the training of orthodontic residents.[3]

While in training, the orthodontic resident in Nigeria is expected to treat a number of cases of malocclusion, with adequate exposure to the use of fixed and removable orthodontic appliances as well as other orthodontic procedures. The orthodontic resident, presents these cases at the final exam of the accredited examination bodies such as the west Africa college of Surgeons and the National Post Graduate Medical College.

The Peer Assessment Rating (PAR) index introduced by Richmond et al is an occlusal index designed to

measure the change brought about by orthodontic treatment and has been used in various orthodontic clinics[4].

Using the PAR index involves measurement of patients' pre and post treatment casts and the component of the index includes measurement of: Upper and lower anterior segment-measuring contact point displacement, Left and right buccal occlusion-assessed in anterio-posterior, vertical and transverse plane; Overjet assessment including an anterior crossbite; overbite assessment –assessing open bites & overbite depth and centerline assessment. The index scores are weighted according to Richmond et al.[4]

The PAR index however as an occlusal index takes no account of other factors that may be of importance to the total quality of treatment such as side effects such as root resorption, white spot lesions and the patient own assessment of his treatment.[5] It is very important that the patient is involved in the planning and execution of orthodontic treatment as there has been known to be a discrepancy sometimes between what the specialist aims to achieve and what the patient truly desires. Thus, the objective of this study was to evaluate the treatment outcome of orthodontic patients treated by senior registrars for the fellowship examinations at the Orthodontic Clinic of the University College Hospital and to compare with the patient assessment of their orthodontic treatment.

Materials and methods

A cross sectional study carried out at the orthodontic clinic of the University College Hospital, Ibadan. Pre and Post treatment casts of patients treated by 5 orthodontic residents, which were presented for final post-graduate residency exams in the last 2 years were selected. A total of 50 sets of pre and post treatment casts were obtained, Ten sets from each resident. The selected casts were of good quality and belonged to patients who had full and available orthodontic records including pre and post treatment pictures and radiograph. These casts represented the patients to be presented by the residents for the final examinations.

The biodata of the patients were obtained from their dental records. Appliance prescription and treatment duration were noted on a data collection sheet. The PAR index was applied on the casts according to Richmond et al.[4] A pre-treatment weighted score, a post-treatment weighted score as well as a percentage reduction were calculated for each cast and recorded. The same patients were recalled to provide their self-perceived improvement in their treated malocclusion using a self-administered questionnaire with a 5 point Likert scale where 1= Worsened presentation, 2= no improvement; 3 = Little improvement; 4= Moderate improvement and 5 = Great improvement; and their pre and post treatment photographs. The data obtained was analyzed using SPSS version 23.0. The results of the univariate analysis were presented using frequency tables. Means were compared using Student's t- test. The association between age at start of treatment, treatment duration and percentage change in PAR score Pearson correlation. The association between the PAR grade and the patients' self-reported improvement was tested using the Fishers Exact Test as some cells had counts less than 5, and correlation with Pearson's Coefficient. The Level of significance was set at $P \leq 0.05$.

Results

The respondents were mostly females (62%), and their ages ranged from 11 to 30 years, with a mean of 15.98 (SD 4.80) and treated mostly using Roth prescription appliance (88%) Other clinical characteristics of the sample are as shown in Table 1

Table 1: Clinical Characteristics of the Sample

		Number = 50	Percentage %
Gender	Male	19	38
	Female	31	62
Appliance Type	Roth	44	88
	MBT	1	2
	Self-Ligating Appliance	5	10
Treatment Modality	Extraction	16	32
	Non- Extraction	34	64

Mean Age =15.98 ±4.80

Range 11-30 years

The mean pretreatment PAR Index score of the sample was 17.96 (SD 8.12) while the mean PAR Score obtained after treatment was 4.20 (SD 4.43). A total of 78% of the sample had their PAR scores falling into the PAR Category of Improvement. Other PAR Index descriptive for the sample is as seen on table 2 and figure 1. Using the patients' self-assessment, 56% of the sample was assessed as great improvement and 44% as improved. See Figure 2

Table 2: PAR Index Descriptives for the Sample.

	Mean	Standard Deviation
Pre treatment PAR Score	17.96	8.12
Minimum = 1		
Maximum =34		
Post treatment PAR Score	4.20	4.43
Minimum = 0		
Maximum = 19		
PAR Reduction score	13.42	7.40
Minimum = 0.00		
Maximum = 32		
PAR %age Reduction	75.38	25.44
Minimum = 0		
Maximum = 100		

The gender of the respondents, the type of appliance utilized for treatment well as treatment modality (with or without extraction) were noted not to have a statistically significant influence on the treatment outcomes regarding the PAR index. This is shown in Table 3.

There was a negative correlation between the age of patient at the start of treatment and the percentage reduction of the PAR score. Though the relationship was weak (Pearson coefficient = -0.14) and not statistically significant. (p = 0.92).

There was also a negative correlation between the total treatment time and the percentage reduction of the PAR score. It was also found to be weak (Pearson coefficient = -0.10, p = 0.78).

There was a positive correlation between the patients' self-reported score and the PAR Index though this association was also found to be weak (Pearson's Coefficient = 0.19) and not statistically significant p = 0.19. Also only 25% of the cases who had a self-reported score of "great improvement" also had a PAR score for "great improvement" as well. The association between PAR index grades and patients' self-reported improvement is shown in Table 4

Table 3: Association between categorical variables and PAR Index Scores.

	Pretreatment PAR Mean(SD)	Post treatment PAR Mean (SD)	PAR Reduction Mean (SD)	Percentage Reduction Mean (SD)
Gender				
Male	18.63 (7.30)	4.89 (3.68)	13.74 (6.97)	74.07 (20.41)
Female	17.54(8.66)	3.77 (4.84)	14.00 (7.60)	76.17(28.39)
p value	0.15	0.28	0.43	0.11
Appliance Type				
Roth	17.31 (7.77)	3.86 (4.34)	13.61 (7.36)	75.52(26.39)
Others	22.67 (9.82)	6.67 (4.68)	16.00 (6.99)	74.30(18.84)
p value	0.67	0.91	0.77	0.18
Treatment Modality				
Extraction	20.25 (7.29)	4.69 (5.28)	15.56 (7.22)	77.49 (23.78)
Non Extraction	16.88 (8.36)	3.97 (4.03)	13.11 (7.30)	74.38 (26.48)
p value	0.32	0.39	0.76	0.74

Table 4: Association between PAR Index Grades and Patients' Self-Reported Improvement

Self Reported Improvement	Par Grade N (%)			
	No Improvement	Improved	Great Improvement	Total
Moderate Improvement	1 (4.5)	19 (86.4)	2(9.1)	22(100)
Great Improvement	1(3.6)	20 (71.4)	7(25.0)	28(100)

Fishers Exact Test = 0.40

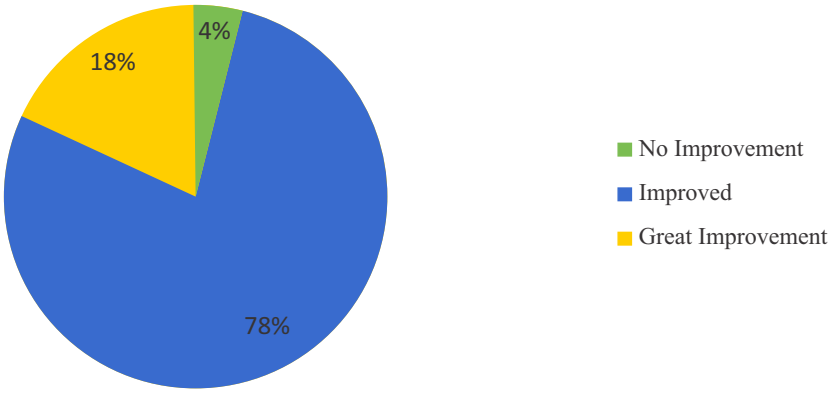

Figure 1: Distribution Of Sample According To The Par Improvement Categories

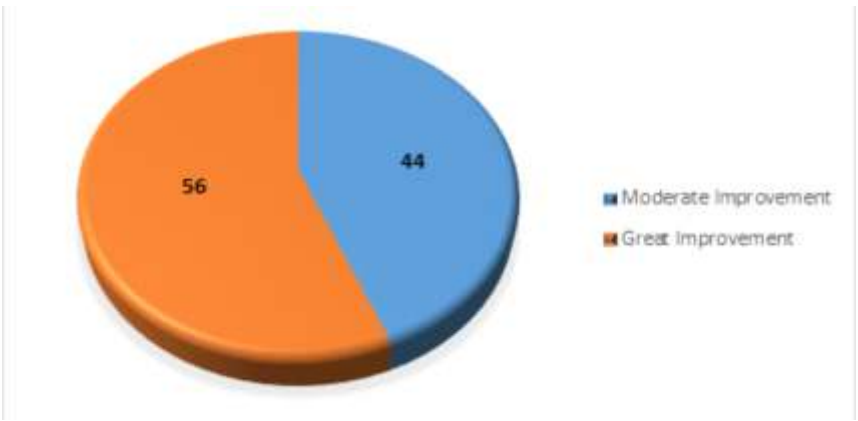

Figure 2: Patients' Self-Reported Improvement

Discussion

The outcome of orthodontic treatments carried out at various orthodontics clinics and training programmes have been reported.[1,3] The treatment outcome at the orthodontic clinic, University College Hospital Ibadan has been presented. The mean pretreatment PAR index scores were lower than that observed in other studies[6–8], however, the post treatment PAR scores are similar to that from a similar orthodontic training programme in Valencia, Spain[7] and University of Alabama.[6] This may mean that cases seen at the orthodontic clinic UCH Ibadan may have been of lower severity compared to the studies above, nonetheless, the treatment outcomes were similar. However, the mean post treatment PAR score in this study was higher when compared with that obtained from another from a graduate orthodontic clinic in the USA[8]. The mean reduction in PAR index in this study was high and similar to that observed in other studies [6,8,9] In addition, a large proportion of the patients in the study were in the "improved" and "greatly improved" category with a very small proportion in the "no improvement" category. This means that a high standard of care was achieved in the treatment of patients at the orthodontic clinic of the University College Hospital Ibadan. According to Richmond et al[4], to produce a high standard of care the mean percentage reduction for a practitioner's case load should be greater than 70%, and the proportion of cases in the no improvement category should be negligible. The mean reduction in a graduate clinic in the USA was reported as 86.2%[8] and 80.5% in a graduate clinic in Valencia, Spain.[7]

Gender and age at commencement of treatment did not have any significant effect on the treatment outcome in this study. This is similar to observation from a similar study[7]. The type of appliance used also did not have a significant effect on the success on treatment. This may mean that whatever the appliance prescription utilized for orthodontic treatment, if properly used could bring about improvement even to high standards of treatment. Furthermore, extraction did not affect the treatment success which indicates that good results can be achieved with both extraction and non-extraction treatment especially with careful/proper treatment planning. This is similar to findings from a study[5]in a graduate orthodontic clinic in Norway.

The patients' perception of their treatment outcome was more of great improvement and moderate improvement. No patient reported "no improvement" nor "little Improvement" in spite of the PAR scores. This shows that patients treated in the orthodontic clinic of the University College Hospital Ibadan are pleased with the outcome of their treatment. Although this was measured subjectively, it has been reported that the lay opinion of malocclusion correlates highly with the orthodontists' opinion of malocclusion.[10] The importance of the patients' input in the process of orthodontic treatment as well as their satisfaction with a treatment regimen cannot be overemphasized. For a treatment regimen to truly be successful, the patient must also be satisfied with its outcome.

The positive correlation between the patients' self-reported improvement and the PAR index scores is expected. This is because patients are likely to become more satisfied and/or impressed as the orthodontic parameters of their occlusion are improved upon. Although this study involved a small sample size, the authors suggest that a study involving a larger sample size be conducted.

Conclusion

At the orthodontic clinic of the University College Hospital Ibadan, orthodontic treatment was carried out to a high standard of care. The patients who received treatment at the clinic reported great improvement in their treated malocclusion.

Based on PAR criteria by Richmond,[4] it can be concluded that a high standard of treatment is adhered to in managing orthodontic patients at the Lagos University Teaching Hospital, Nigeria. An overall mean percentage reduction shows the standard maintained in orthodontic treatment at LUTH is high.

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