An Audit of Orthodontic Cases treated at Obafemi Awolowo University Teaching Hospital Complex (OAUTHC), Ile-Ife, Nigeria.

AdelekeMF[a], FadejuAD[b],OtuyemiOD[c]

Abstract

Background: The importance oforthodontic treatment audit cannot be overemphasized. Apart from providing a feedback, it also helps to maintain, monitor and promote treatment standards . The purpose of this study was to assess the quality of orthodontic treatment outcome at OAUTHC Ile-Ife, Nigeria.

Method: The sample consisted of randomly selected pre and post treatment study models of patients seen in 2011 to 2013. The patients had complete records documenting the treatment carried out by both orthodontic trainees and trainers. Information obtained from the records included, age, sex and dental personnel that carried out the treatment. The Peer Assessment Rating Index (PAR) was used to assess the treatment outcome .

Results: Thirty cases were selected within the 2 year period. There were 16(53.3%) males and 14(46.7%) females and within the age range of 9-33years (mean age16.8 +/5.7).Generally,there was a significant improvement in treatment outcome with over 80% falling into the highly improved category. There were no significant differences in the treatment outcomes according to age group, gender and dental personnel involved in the treatment .

Conclusion: This study concluded that cases managed at the Orthodontic Unit of Obafemi Awolowo University Teaching Hospital Ile-Ife Osun State, were treated to an acceptable occlusion and alignment. Patients motivation and cooperation during treatment may have contributed greatly towards achieving desired treatment goals and outcome.

Key words: audit, treatment outcome, PAR index, orthodontics

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Authors Affiliations

[a]*House Officer, Obafemi Awolowo University, Ile-Ife, Nigeria*

[b]*Lecturer, Dept. Of Child Dental Health, Obafemi Awolowo University, Ile-Ife Nigeria*

[c]*Professor of Orthodontics, Dept. Of Child Dental Health, Obafemi Awolowo University, Ile-Ife, Nigeria*

Correspondence Author

Prof. Otuyemi OD, Dept. Of Child Dental Health, Obafemi Awolowo University, Ile-Ife, Nigeria email.ootuyemi@yahoo.

Introduction

Evaluation of orthodontic treatment results has been a subject of great interest for several decades[1-3]. Clinical assessment of treatment outcomes in form of personal, regional or institutional audit provides the opportunity to evaluate and establish whether a worthwhile success or improvement has been achieved for an individual treated case or the proportion of cases that showed improvement following orthodontic treatment. The advantages of such an audit cannot be overemphasized. Apart from providing a feedback for the orthodontist, it also helps to maintain, monitor and promote uniformity in treatment standards [4]

One of the earliest type of audit was carried out by Berg in which he analysed 248 consecutively treated cases[5]. The majority having undergone fixed appliance treatment. The authors looked at both the dental cast and radiographic records. They found that the objectives were only achieved in 43 percent of all cases. Rootresorption was present in 14 percent and over jet was not eliminated in 13 percent of class II cases. The objectives were not achieved in a substantial proportion of Class I, Class II and Class III malocclusions. Although all the objectives had not been achieved, substantial improvement had been attained.

In a further study, Berg and Fredlund used the treatment Priority Index (TPI) on 60 cases selected randomly from 329 consecutively treated patients in two private practice[6]. At the end of the study, 36 cases, sixty percent achieved normal or near normal occlusion. They suggested that the degree of improvement was more important than the success of treatment in that ideal occlusion is not always possible to achieve as it is more of hypothetical than reality.

In order to meet the criteria of uniform interpretation and application, the Peer Assessment Rating (PAR) index was

developed as an objective method of determining treatment outcome [7,8,9].

The index has been used by a number of authors as a form of internal or regional audit in immediate post treatment [10] and long-term basis [11].

The aim of this study was to assess the quality of orthodontic cases treated at a Nigerian tertiary institution within a period of time.

Methods

The sample consisted of randomly selected pre and post treatment study models of patients seen between 2011 and 2013, whose treatment had been completed at Obafemi Awolowo University Teaching Hospital Complex (OAUTHC), Ile-Ife, Nigeria. Information obtained from each patient includedage, sex, thedental personnel that carried out the treatment.

Assement of Treatment Outcome

As presently formulated, the PAR index provides an initial estimate of how far a case deviates from normal, while the difference between the pre and post treatment scores reflects the degree of improvement[7,8,9]. The PAR index consists of seven components.

1. Upper anterior contact point displacement.
2. Lower anterior contact point displacement
3. Right buccal occlusion in three planes of space
4. Left buccal occlusion in three planes of space.
5. Overjet
6. Overbite
7. Centreline discrepancy

In order to accurately reflect contemporary opinion, overjet, overbite and centreline discrepancy would be multiplied by predetermined weightings of 6, 2 and 4 respectively. The individual components summed up to give an overall score which reflects the deviation from normal occlusion. The PAR ruler is designed specifically to measure various components of PAR index. The degree of improvement would be assessed using the percentage improvement (less than 30% equals “worse or no difference, Greater than 30% equals (improved).

Summary of PAR score assessment

Contact point displacement score(upper and lower)	Displacement
0	0mm to 1mm
1	1.1mm to 2mm
2	2.1mm to 4mm
3	4.1mm to 8mm
4	Greater than 8mm
5	Impacted teeth.
Buccal occlusion assessment score (right and left)	
Antero-posterior	
0	Good interdigitation class I,II,III
1	Less than half unit from full interdigitation.
2	Half a unit (cusp to cusp)
Vertical	
0	No open bite
1	Lateral open bite on at least two teeth greater than 2mm

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Transverse

0	No cross bite
1	Cross bite tendency
2	Single tooth in cross bite
3	More than one teeth in cross bite
4	More than one tooth in scissors bite.

Over jet assessment

0	0 to 3mm
1	3.1mm to 5mm
2	5.1mm to 7mm
3	7.1mm to 9mm
4	Greater than 9mm

Anterior cross bite

0	No cross bite
1	One or more teeth edge to edge.
2	One single tooth in crossbite
3	Two teeth in crossbite
4	More than two teeth in cross bite

Canine cross bites are recorded in the over jet assessment

Overbite assessment

Open bite assessment

0	No open bite
1	Open bite less than or equal to 1mm
2	Open bite 1.1mm to 2mm
3	Open bite 2.1mm to 3mm
4	Open bite greater than or equal to 4mm

Overbite

0	Less than or equal to 1/3 coverage of the lower incisor
1	Greater than 1/3 but less than 2/3 coverage of the lower incisor
2	Greater than 2/3 cover age of the lower incisor
3	Greater than or equal to full tooth coverage

Centreline assessment

0	Coincident and up to ¼ lower incisor width
1	One quarter to ½ lower incisor width
2	Greater than one lower incisor widths

Statistical Analysis

Data was analysed using statistical software package SPSS 16 version. Mean, frequency and percentages of variables were determined. P value was inferred at 0.05. Test of significance was done using Chi square.

Results

Of the 30 randomly selected cases, there were 16 (53.3 %) males and 14 (46.7 %) females as shown in Table I. Minimum age of the patient assessedwas 9 years while the maximum age was 33 years with mean age of 16.8 and SD ±5.7 (Table II).

Table I: Gender distribution of patients

	Frequency	Percentage (%)
Male	16	53.3
Female	14	46.7
Total	30	100

Table II: Percentage age distribution of patients

Age(years)	Frequency	Percentage (%)
9	1	3.3
10	1	3.3
12	3	10.0
13	6	20.0
14	1	3.3
15	3	10.0
16	4	13.3
18	3	10.0
19	2	6.7
20	2	6.7
24	1	3.3
28	1	3.3
30	1	3.3
33	1	3.3
Total	30	100

Mean age(SD) : 16.8 ± 5.7

Of the 30 patients that were treated 17 patients 56.7% were seen from bonding to debonding by the Consultant while 13 patients 43.3% were seen by the Senior Registrars as shown in Table III.

Table III: Treated cases according to dental personnel

	Frequency	Percentage (%)
Consultant	17	56.7
Senior Registrar	13	43.3
Total	30	100.0

Age less than or equal to eighteen years had the highest number of patient with greatly improved outcome while ages greater than or equal to nineteen years had no case in the worse or no difference outcome as shown in Table IV

Table IV: Distribution of treatment outcome according to age

Age	Greatly improved	Improved	Worse or no difference
≤ 18	18	2	2
≥ 19	10	1	0
Total	25	3	2

P value= 0.598

Comparing gender and outcome of treatment, male gender had more patients with greatly improved outcome than female patients as shown in Table V.

Table V: Distribution of treatment outcome according to gender

	Greatly improved	Improved	Worse or no differences
Male	13	2	1
Female	12	1	1
Total	25	3	2

P value = 0.087

Table VI: Distribution of treatment outcome according to dental personnel

	Greatly improved	Improved	Worse or no Difference
Consultant	16	1	0
Senior Registrar	9	2	2
Total	25	3	2

P value = 0.053

Table VI above showed that 16 patients out of the 17 patients treated by Consultants had greatly improved outcome, 1 patient had improved outcome, while 9 out of the 13 patients treated by Senior Registrar had greatly improved outcome, 2 patients had improved outcome and 2 patients had worse or no difference outcome.

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Discussion

One of the limitations experienced during this study has been the problem of poorly kept pre and post treatment records of cases treated. This has prevented the inclusion of more treated cases for evaluation in this present study. Many cases were not yet completed when this present study was conducted.

Generally, a tremendous improvement was noticed in over 80 percent of cases treated in this study. This shows that the standard of treatment in our teaching hospital is high and therefore comparable to other studies using the same assessment criteria [12, 13] .The experience of the orthodontist and strict treatment guidelines for patients may be some of the reasons why the treatment outcomewas high. The successful treatment outcome could be due to careful treatment planning.

In a study done previously in this centre evaluating treatment standard of 52 cases during orthodontic postgraduate training by Otuyemi[12], results indicated that a high standard was achieved (overall mean percentage reduction in weighted PAR score greater than 70 %). However some cases worsened despite the treatment efforts[14].

There were no gender differences in the PAR scores observed in this present despite more male gender than females in the greatly improved percentage score category. This observation is similar to the study by Ahmad and Fida[15].

Majority of cases in this study were treated by orthodontists rather than senior registrars. Most cases handled by the senior residents were under strict supervision of the consultants during their clinical rounds. Thus the observation in this study. Treatment outcome by the consultants as compared to the senior registrars was found not to be statistically significant. Normally the consultants are more experienced but this did not reflect in this situation.

The age distribution of cases in this study has little or no influence on the treatment outcome. There was no difference in the treatment outcome of young and old patients and this may be due to equal cooperation by patients and strict adherence to instructions by both adolescents and adults alike during treatment. There may also be a high level of motivation towards orthodontic treatment by these patients.This observation is similar to that of Ahmad and Fida[14] where there were no correlation between age, gender and malocclusion groups and treatment outcome[15].

Although, it is important to note that there is an improvement in dentition after orthodontic treatment, tendency to return to original malocclusion many years post retention exist [7,10].

It would be interesting to follow up these cases for several years so as to ascertain the stability of the treatment outcome achieved. It is also recommended that regular audit of treatment outcome should be done periodically.

Conclusion

It is therefore concluded that cases managed atthe Orthodontic Unit of Obafemi Awolowo University Teaching Hospital Ile-Ife Osun State, were treated to an acceptable occlusion and alignment. Patients' motivation and cooperation during treatment may contribute greatly towards achieving desired treatment goals and outcome.

Contributors

Adeleke MF was partly responsible for design, collected data , analysis and writeup.
Fadeju AD was partly responsible for data analysis, interpretation of data and partly responsible for writeup
Otuyemi OD was responsible for study conceptualization and design, partly responsible for interpretation, writeup and final approval.

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