

# Assessment of Clinical Case Presentations for the Membership in Orthodontics, Royal College of Surgeons of England 1995, 1996

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**Abstract:** *The cases presented and treated at successive examinations by the candidates for the Membership Examination in Orthodontics in 1995 and 1996 at The Royal College of Surgeons of England, were of a very high standard and demonstrated a wide range of treatment modalities. All cases had fixed appliances, predominantly with pre-adjusted Edgewise appliances. IOTN confirmed that most cases were in great need of treatment, with PAR scores showing them to be treated to a high standard.*

*Index Words:* Assessment, Case Presentations, M. Orth.

## Introduction

The Membership in Orthodontics of the Royal College of Surgeons of England is taken after a minimum of 2 years 9 months of recognized specialty training in orthodontics and is awarded to the successful candidates after completing 3 years training. An essential element of the examination is the presentation of the case records of three completed cases. It is necessary that these cases have been treated entirely by the candidates and these cases should represent the best efforts of the candidates during the training programme. It is expected that the cases will have been supervised closely during the training of the specialist, and therefore a high standard of treatment and case records is required.

It was considered appropriate therefore to evaluate the nature and variation of cases being treated, and the quality of the results of these presentations on two consecutive years, 1995 and 1996. The objective was to establish an insight on the standards of the cases to enable comparison in future years or in other examinations.

There are three cases presented by each of the candidates at the examination. These cases were assessed by two independent assessors not involved in the examination, and the nature of the treatment recorded. It was decided to use indices to record, first, the nature of the malocclusion being treated by the candidates, and secondly, the quality of the result and degree of improvement achieved.

The Index of Orthodontic Treatment Need (Dental Health Component) described by Brook and Shaw (1989) is an accepted means of identifying those patients who would most benefit from orthodontic treatment. There are five grades for the Dental Health Component (DHC) with Grade 5 indicating a great need for treatment and Grade 1 indicating no need for treatment. Generally, cases with Grades 4 and 5 are objectively regarded as being in the greatest need of treatment.

The Peer Assessment Rating (PAR) is a mechanism devised to assess the degree of improvement achieved from orthodontic treatment (Richmond *et al.*, 1992a,b). The concept is to assign a score to various occlusal traits which make up a malocclusion.

## Method and Materials

The case presentation folders and study casts presented by each candidate were independently scored, for PAR and IOTN, by two assessors. They had been trained and calibrated in the use of the indices.

In July 1995, of the 19 candidates, a total of 55 case presentation folders were available for assessment. IOTN, and pre- and post-treatment PAR scores were measured independently by the two assessors. In June 1996 there were 20 candidates and 56 case presentations were scored for IOTN and PAR, by the same two examiners as for the 1995 examination.

In addition, a third assessor recorded the type of malocclusion, extraction pattern, and appliance systems used during treatment.

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The instructions to candidates outlined that marks would be awarded for:

- (1) the severity of the case and the difficulty of the treatment;
- (2) the quality of the result obtained and the candidates understanding of the treatment undertaken.

## Results

The number of case presentations in each of the five categories of IOTN is shown in Table 1. In 1995, 80 per cent of the cases were IOTN 4 and 5, and 96 per cent in 1996. The range and means of the PAR values in Table 2a, in both years, show marked consistency. The number of cases shown to be 'greatly improved' in Table 2b is extremely high.

The malocclusion types of the cases are shown in Table 3. The extraction pattern in Table 4 is such that 77 per cent of cases in 1995 and 66 per cent in 1996 were extraction cases, with almost 80 per cent of these involving premolar extraction's, although only a limited number involved extraction of four first premolars.

The range of malocclusion types is illustrated by two cases. In case number 23 (1995) the IOTN is 5i with a pretreatment PAR score of 50 (Figure 1a-e) and end of treatment score of 4 (Figure 2a-e). The change in PAR score would be considered 'greatly improved'. Case number 15 (1996) required the extraction of four first molars and fixed appliances. This case has a low IOTN of 2 with pretreatment PAR score of 26 (Figure 3a-e) and end of treatment score of 3 (Fig. 4a-e). The change in PAR of 23 is also 'greatly improved'.

TABLE 1 *Index of Orthodontic Treatment Need (Dental Health Component) for case presentations in July 1995 and June 1996*

IOTN (DHC)	1995	1996
5	11 cases (26%)	15 cases (27%)
4	24 cases (56%)	39 (69%)
3	7 cases (16%)	2 (4%)
2	1 case (2%)	0
1	0	0

TABLE 2 *Range, means, percentage change, and mean reduction in Peer Assessment Rating for case presentations in July 1995 and June 1996*

### (a) Range and means

PAR	1995	1996
Range of pretreatment PAR	10-56	10-59
Range of post-treatment PAR	1-11	0-12
Range of change in PAR	3-53	6-58
Mean pretreatment PAR	36	38
Mean post-treatment PAR	4	4

### (b) Percentage change and mean reduction

**JUL 95** Percentage of cases with change in PAR > 22; 'greatly improved' = 82 %

**JUN 96** Percentage of cases with change in PAR > 22 = 90 %

**JUL 95** Mean percentage reduction in PAR = 84%

**JUN 96** Mean percentage reduction in PAR = 88%

Table 5 shows that 89 per cent of cases in 1995 and 88 per cent in 1996 had pre-adjusted ('Straight Wire') fixed appliances. Functional appliances were used in combination with fixed in 14 per cent in 1995 and 19 per cent in 1996.

Assessment of agreement between observer 1 and observer 2 for the Dental Health Component of IOTN, was tested using the kappa statistic (Cohen, 1960). According to Cohen the coefficient  $k$  is the proportion of agreement after chance agreement is removed from consideration. An unweighted kappa statistic was deemed to be appropriate for this study.

The kappa statistic (Table 6a) for observers 1 and 2 in 1995 is 0.96. This is considered to be an excellent agreement between the two observers. The value of  $k$  in 1996 was 0.80 which is considered a substantial agreement.

Assessment of the PAR scores for the two observers were tested using intra-class correlation coefficients shown in Table 6b. The pretreatment PAR score correlation coefficients in both years show good agreement between the observers. The post-treatment correlation coefficients show only a moderate agreement and a statistically significant difference. This may be explained by the relatively narrow range of post-treatment values, which, in turn, will highlight small differences between the observations.

## Discussion

The dental health component of IOTN indicated that 81 per cent of the cases presented in 1995 and 96 per cent in 1996 had a definite need for treatment. In 1995, 16 per cent had a 'borderline need', whereas in 1996 this was lower (4 per cent). This compares favourably with Shaw *et al.* (1991) who showed that 74.4 per cent of 222 patients referred to a hospital unit were in grades 4 and 5, and 19.7

TABLE 3 *Malocclusion of case presentations presented in 1995 and 1996*

	1995	1996
Class I	9 cases (16%)	12 cases (21%)
Class II/1	24 cases (44%)	25 cases (45%)
Class II/2	9 cases (16%)	7 cases (13%)
Class III	13 cases (24%)	12 cases (21%)

TABLE 4 *Extraction pattern of cases presented in 1995 and 1996*

	1995	1996
Extraction cases	43 cases (77%)	37 cases (66%)
Non - extraction	12	19
Previous extractions	6	6
Premolars	34 cases (79%)	29 cases (78%)
4 Premolars & $\overline{77}$	1	1
2 Premolars & 6's	3	
4 First molars	2	5
2 upper Premolars & 1\	1	
3 Premolars & $\overline{3}$	1	
$\overline{77}$ only	1	
4 second molars	1	
$\overline{33}$ & Premolars	1	
Osteotomies	5 (9%)	5 (9%)
Restorative	2	3

per cent in grade 3. The IOTN and PAR do not necessarily reflect the difficulty of treatment. The case presentation in 1995 with IOTN of 2 (Fig. 3, 4), required extraction of all first molars and is likely to have required considerable skill in producing a good result.

A change in PAR of more than 22 points is considered to be greatly improved and 82 per cent of the cases in 1995, and 90 per cent in 1996 were judged to be in this category. The mean percentage reduction in PAR was high at 84 per cent and this compares very favourably with the personal audit carried out by Richmond (1993), who achieved a reduction of 74 per cent. The mean post-treatment PAR score of 4 (1995 and 1996) is also lower than the mean score of 7 presented by Richmond in 1993. In a survey of

specialist practitioners, by Kelly and Springate (1996), a mean PAR reduction of 89 per cent was greater than the candidates presented for the membership examination. However, it would appear the specialist practitioner cases were only scored by a single individual and so possibly subject to bias. The specialist practitioners had a mean pre-treatment score of 26.6 compared to 37 for the examination cases, which suggests that the examination cases were of far greater complexity. A post-treatment PAR score of 4 would be equivalent to a centre line discrepancy of a quarter to a half lower incisor width. The worst post-treatment PAR score of 11 (1995) would approximate to a residual overjet of 4 mm and an increased overbite of greater than two-thirds coverage of the lower incisors.

TABLE 5 Appliance types for 1995 and 1996 case presentations

(a) Fixed appliances		
	1995	1996
Straight wire	49 cases (89%)	50 cases (88%)
Headgear	20	30
RME	2	2
Begg	3	1
Tip Edge	2	3
(b) Functional appliances		
	8 (914%)	11 (19%)
Twin blocks	5	6
Harvold	1	
Tuescher	1	
Bionator	1	2
Frankel	2	
Bass	1	
Upper removable appliances	13 cases (23%)	25 %
URA & Headgear	4	

TABLE 6 Observer agreement for IOTN in 1995 and 1996 using kappa (k) statistic and correlation coefficients for pretreatment, post-treatment and change in PAR. Paired t-tests applied to test significant differences in PAR

(a) IOTN: kappa statistic		
	1995	1996
k	0.96	0.80
(b) PAR: correlation coefficients		
	1995	1996
Pretreatment	0.88	0.90
Post-treatment	0.71	0.69
Change	0.85	0.89
(c) PAR: Paired t-tests		
	1995	1996
Pretreatment	NS	NS
Post-treatment	NS	P < 0.05
Change	NS	NS

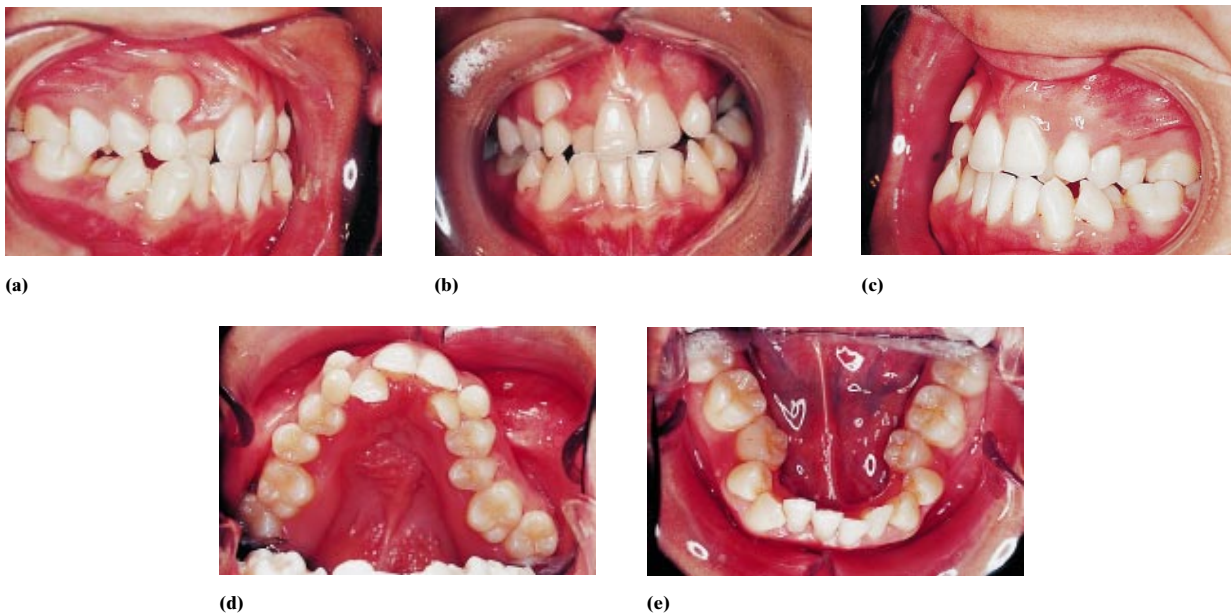


FIG. 1 (a,b,c,d,e) Case number 23; pretreatment (1995).

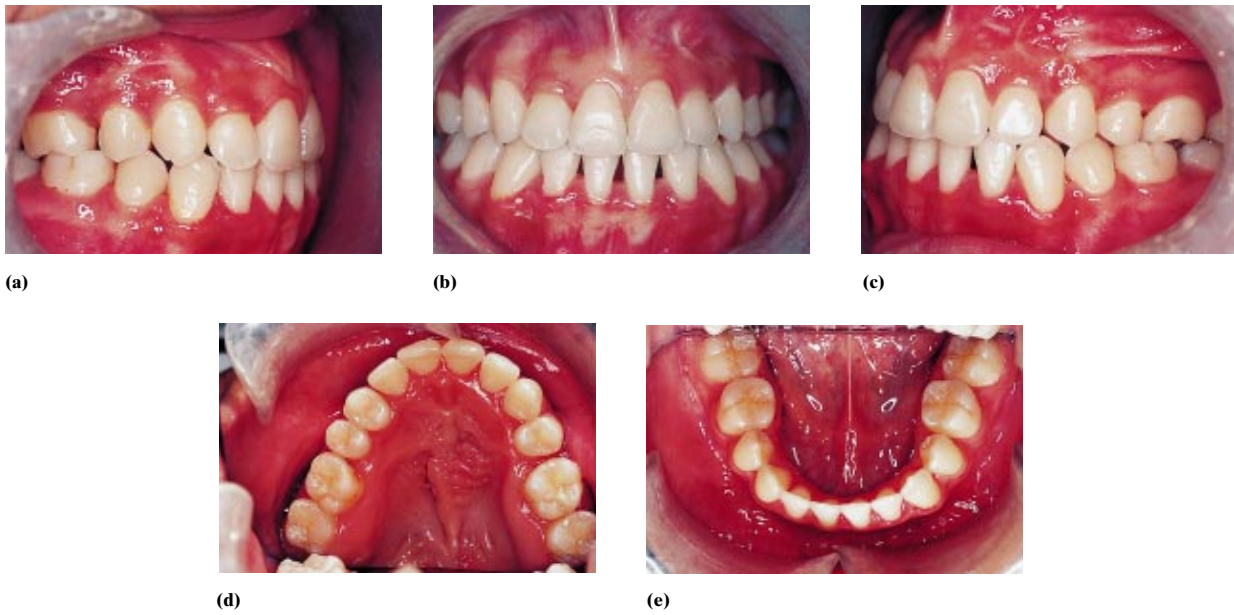


FIG. 2 (a,b,c,d,e) Case number 23; post-treatment (1995).

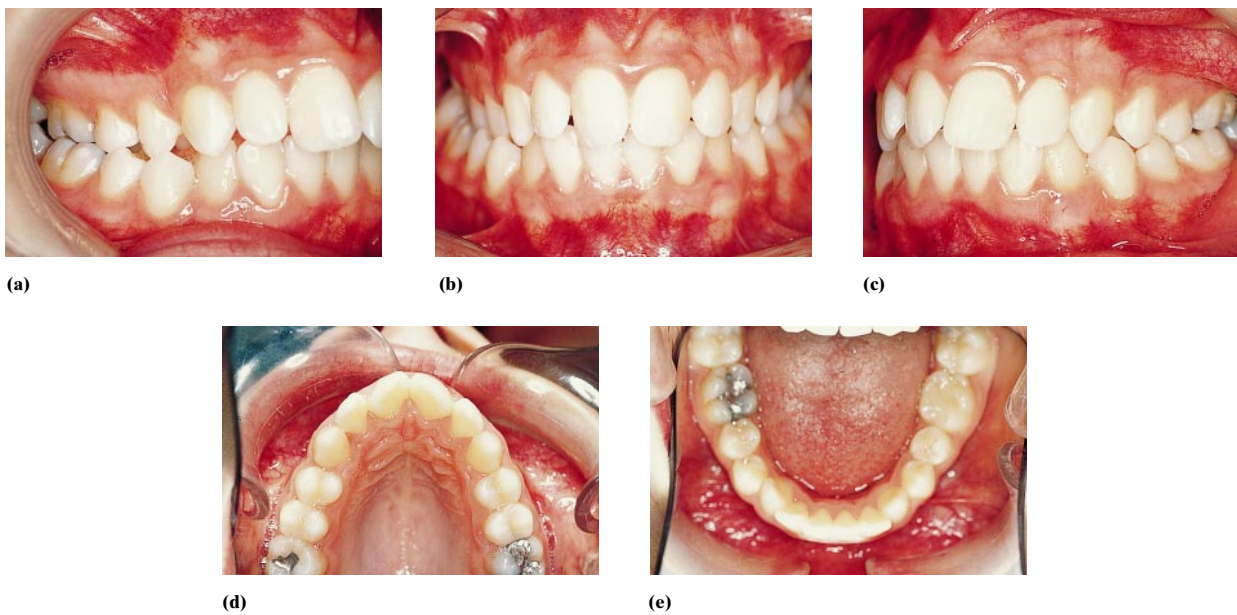


FIG. 3 (a,b,c,d,e) Case number 15; pretreatment (1996).

In 1995 and 1996, more than three-quarters of the cases underwent extractions, with 79 per cent being premolars in 1995 and 78 per cent in 1996. The remaining extractions involved combinations of premolars, molars, and only one case with upper second molars alone. All cases had a fixed phase of treatment, using pre-adjusted systems (SWA) in 49 cases in 1995 (89 per cent) and 50 cases (88 per cent) in 1996. Begg and Tip Edge accounting for five of the cases in 1995 and four cases in 1996. Functional appliances were used in a multi-phased treatment approach with headgear and fixed appliances often following the functional appliance treatment. In both years 9 per cent of cases involved

osteotomies, with four of the surgical cases in 1995 and three in 1996 requiring bimaxillary procedures.

It should be remembered that these cases represent the best efforts of supervised postgraduate trainees who in the main have little or no previous personal experience of complex orthodontic treatment.

### Conclusions

The case presentations were of a high standard and demonstrated a wide range of treatment modalities. Premolar

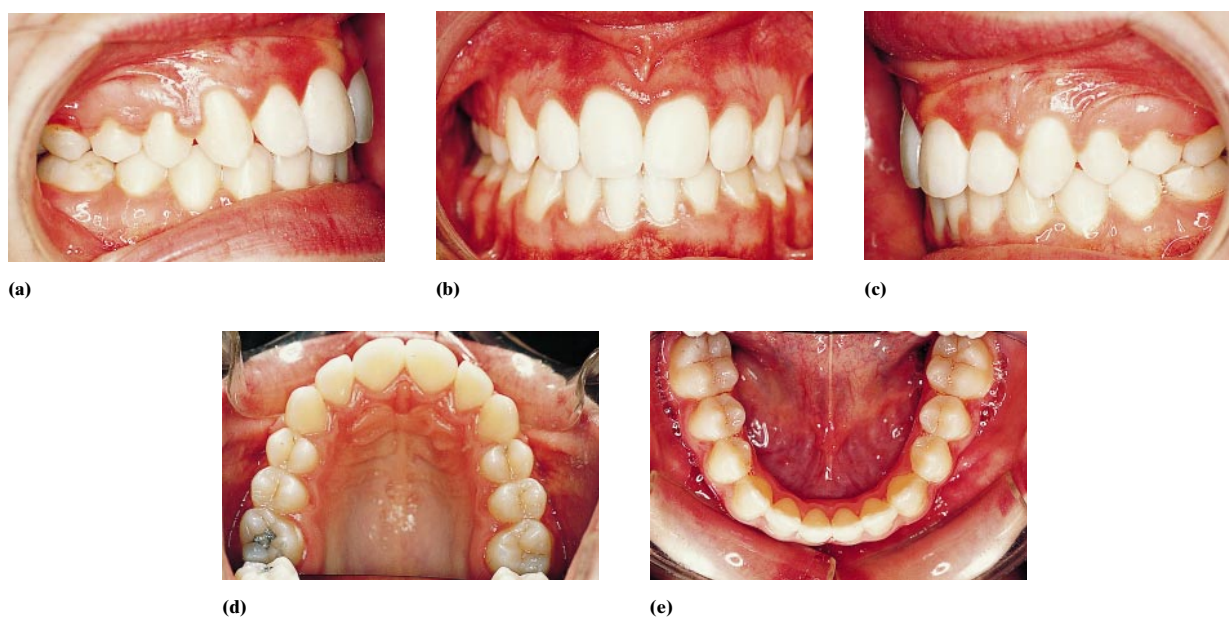


FIG. 4 (a,b,c,d,e) Case number 15; post-treatment (1996).

extraction's and pre-adjusted fixed appliances were the main type of treatment. The clinical need for treatment, as shown by IOTN, was high and the vast majority of cases were treated to a high standard.

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