

# Social inequality and discontinuation of orthodontic treatment: is there a link?

Elizabeth A. Turbill\*, Stephen Richmond\*\* and Jean L. Wright\*

\*Orthodontic Unit, University Dental Hospital of Manchester and \*\*Department of Child Dental Health, University of Wales School of Medicine, Cardiff, UK

**SUMMARY** The aims of this study were to investigate the effects of social inequality on the likelihood of patients discontinuing orthodontic treatment, and to determine which, if any, indicators of social inequality are of greater relevance.

In this retrospective study of English and Welsh General Dental Services (GDS) cases, consecutive 'discontinued' cases collected at the Dental Practice Board (DPB) during 1990–91, were compared for age, treatment modality, and measures of social inequality, with a 2 per cent sample of cases contemporaneously submitted as 'complete'. Three deprivation indices, and occupation-based social class spectra of neighbourhoods, were compared between the groups. A model was sought to predict discontinuation/completion using logistic regression analysis.

The discontinued sample represented lower social stratum spectra for home and practice areas under all indicators tested, and the subjects were a little older at the start of treatment. Fewer were treated by orthodontically qualified practitioners or with fixed appliances, but more with extra-oral traction. Occupation-based classification (patient's home) and the Carstairs Index (practice area) were selected by the analysis as explaining more of the variation than other measures of social inequality, but the model failed to predict the discontinued cases.

Lower social class may be a risk factor for discontinuation of orthodontic treatment, but is not a predictor for it. Patients should be considered for, and counselled about, orthodontic treatment on an individual basis.

Occupation-based social classifications and the Carstairs Index may be a little more sensitive to orthodontic applications than other indicators of social inequality.

## Introduction

Social inequality influences general health, dental disease, and dental health-related behaviour (Bulman *et al.*, 1968; Sheiham and Hobdell, 1969; Gray *et al.*, 1970; Carstairs, 1981; Townsend and Davidson, 1982; Jenkins *et al.*, 1984b; Eddie and Davies, 1985; Gratrix and Holloway, 1994). However, reports on any links between orthodontics and social inequality are more equivocal.

Social inequality can be defined in several ways, and the relevance of any measure has been said to depend upon the aspect of healthcare being evaluated (Morgan, 1983). The United Kingdom (UK) Registrar General's classification (Table 1), based on the occupation of the head of household, has been widely used for health services research in the UK since 1911, but latterly the Jarman index was developed (Jarman, 1984), based on factors that medical general practitioners identified as potentially increasing their workload, and is widely used for health service planning. The Carstairs Index was developed in Scotland to link health and deprivation (Carstairs and Lowe, 1986), and the Townsend Index of Material Deprivation (Townsend, 1987; Townsend *et al.*,

1988) has been shown to explain more variables in health than social class (Table 2). All these indices have shown strong correlations with dental health (Provart and Carmichael, 1995; Jones *et al.*, 1997; Prendergast *et al.*, 1997; Sweeney *et al.*, 1999), but no measure of inequality has yet been shown to have clearer relevance to orthodontics. Several orthodontic studies have assessed social inequality using occupation-based measures (Shaw, 1981; Rölling, 1982; Jenkins *et al.*, 1984a,b; Kenealy *et al.*, 1989; Roberts *et al.*, 1989; Turbill *et al.*, 1999a,b), but two recently (Mandall *et al.*, 1999; Radzic, 1999) used the Townsend Material Deprivation Index, whilst Burden *et al.* (1994) used ACORN (A Classification of Residential Neighbourhoods; CACI, 1990), although this latter is an unranked classification and unwieldy for use in a national study.

Concern with dental appearance, referral, and treatment for mild malocclusions and complex treatments have been linked to the higher social classes (Rölling, 1982; Townsend and Davidson, 1982; Jenkins *et al.*, 1984a; Kenealy *et al.*, 1989). Others found no links between social inequality and perceived orthodontic need (Shaw, 1981; Roberts *et al.*, 1989), or levels of

**Table 1a** Registrar General's social class groupings (by occupation of head\* of household).

Social class	Definition and examples
I	<b>Professional</b> e.g. medical, dental, veterinary, and legal professions, chartered engineers and accountants
II	<b>Intermediate and managerial</b> e.g. school teachers, nurses, police officers, secretaries, publicans
IIIN	<b>Skilled non-manual workers</b> e.g. clerks, draughtsmen, shop assistants, travel agents
IIIM	<b>Skilled manual</b> e.g. carpenters, electricians, welders, instrument artificers, police constables, mechanics
IV	<b>Semi-skilled</b> e.g. lathe operators, process workers, postmen/women
V	<b>Unskilled workers</b> e.g. labourers, dustmen, domestics

\*Head of household is defined as the male partner, or as the elder partner if both partners of same sex.

**Table 1b** Classification by occupation used by Rölling (1982).

Social class	
A	<b>Low</b> e.g. unemployed, unskilled manual
B	<b>Lower middle</b> —skilled manual
C	<b>Middle</b> e.g. shop assistants, clerks, small self-employed
D	<b>Upper middle</b> e.g. superior employees, shop owners, farmers
E	<b>Upper</b> e.g. academics, managers

**Table 2** Deprivation indices and their constituent variables and weightings.

Social variable	Carstairs and Lowe (1986)	Jarman (1984)	Townsend (1987)
Unemployment	1	3.34	1
Overcrowding	1	2.88	1
No car	1	2.88	1
Not owner occupied	—	—	1
Lone pensioners	—	6.62	—
Single parents	—	3.01	—
New Commonwealth	—	2.50	—
Lack of toilet amenities	—	—	—
Children under 5	—	4.64	—
Low social class	1	3.74	—
One year migrants	—	2.68	—

N.B. The above variables are percentage of households in local government area affected, but definitions of variables vary to some extent between indices.

unmet objective need (Burden *et al.*, 1994). However, an under-supply of General Dental Service (GDS) orthodontic providers in lower class areas of the UK has been suggested (Turbill *et al.*, 1999a), and Mandall *et al.* (1999) found children from relatively deprived areas were less likely to have had orthodontic treatment, despite often feeling a more negative aesthetic impact from their dental appearance, than those from affluent areas. These findings may be linked to anecdotal evidence that

some practitioners are guarded about accepting orthodontic patients from lower classes, poorer families or areas ('prescription by postcode'), as they expect less commitment from such patients. It is noteworthy that it was thought that 'labourers or domestic servants' would be happy with a lesser level of orthodontic care, two decades before the start of the UK's National Health Service (Steadman, 1925).

Reports on discontinuation rates vary, e.g. 3 per cent in Denmark (Rölling, 1982), 12.8 per cent in UK hospitals (Murray, 1989), 15–25 per cent in the UK's GDS (Department of Health and Social Security, 1986; Dental Practice Board, 1992), and 25 per cent in the UK's Community Dental Service (CDS) (Radnzcic, 1999).

Appliance type has been linked to discontinuation (Myrberg and Thilander, 1973a,b; Murray, 1989; Richmond and Andrews, 1995). However, Murray (1989) found no link with extra-oral traction/anchorage (EOT/EOA).

Only slight differences in entry and exit levels of malocclusion were found between various categories of GDS patients who discontinued in 1990–91, and those who had completed in 1987–88 (Richmond and Andrews, 1995). However, no exit data were available for the substantial number of patients (78 per cent of the sample) who failed to return, so the overall quality of the result, and the balance of risk to benefit for discontinued cases, may be poorer than that study seems to imply.

Patient age has been linked to poor co-operation and discontinuation by Allan and Hodgson (1968) and Haynes (1982), but not by Murray (1989). Patient personality has been linked to co-operation (Story, 1966; Allan and Hodgson, 1968; Starnbach and Kaplan, 1975; Weiss and Eiser, 1977), and failed appointments and inexperienced operators to discontinuation (Murray, 1989).

Rölling (1982) linked discontinuation to poor co-operation. He found no sex differences, but children from manual class households discontinued more often than others (5 per cent compared with 2–3 per cent;  $P < 0.05$ ).

A series of completed cases contemporaneous with the discontinued ones described by Richmond and Andrews (1995) has now been assessed. Entry and exit

Peer Assessment Rating (PAR) data had changed little since the 1987–88 study (Turbill *et al.*, 1996, 1998, 1999a), so the basic comparisons noted above are still valid, although the inferences regarding outcomes for discontinued cases are limited.

The aim of this investigation was to compare completed and discontinued GDS orthodontic cases to elucidate whether there were real differences in discontinuation between social strata, and which, if any, of the commonly used measures of social inequality were the more relevant.

## Subjects and methods

### Subjects

Collection of the completed cases used in this study has been described previously (Turbill *et al.*, 1996, 1998); the DPB's routine systematic 2 per cent sample for a period of several months from 1990–91 was used. The discontinued cases have also been described (Richmond and Andrews, 1995); they were consecutive cases contemporaneously claimed as discontinued. The three subgroups of discontinued cases were submitted to preliminary exploration. No significant differences were found between them in deprivation or social class indicators, so they were considered together for the purposes of this study.

### Methods

Data available included patients' dates of birth, postcodes for home and practice attended, appliances used and practitioners' qualifications.

Postcodes were correlated to (Registrar General's, RG) social class and deprivation index data from the 1991 UK census, using SASPAC (The London Research Centre, 1992). The following data were obtained for each postcode:

- percentage of manual class (UK RG's classes IIIM, IV, and V) heads of household in area
- Carstairs Index score of area (Carstairs and Lowe, 1986)
- Jarman Underprivileged Area Index score (Jarman, 1984)
- Townsend Material Deprivation Index score (Townsend, 1987).

These were compared for the homes and practices of both groups.

*Statistical procedures.* Student's *t*-tests were used to compare means of continuous variables between the various groups. Chi-squared was used for categorical comparisons. *Pre hoc* sample sizes were not carried out as there was no directly comparable previous study, but

*post hoc* power calculations (two-by-two Chi-squared with continuity correction,  $P < 0.05$ ) were undertaken on the bivariate data at the different levels found.

Logistic regression software (SPSS, 1999) was used to find a model for discontinuation. Variables were reduced to bivariate factors, using the medians for age and social class data as 'cut-offs'. Factors with individual probability values  $< 0.1$  were submitted to the forward step analysis, set at  $P(\text{entry}) = 0.05$ ,  $P(\text{removal}) = 0.1$  (the SPSS default). These factors were:

- younger or older patient age at start
- whether or not the practitioner had an orthodontic qualification
- whether or not fixed appliances were used
- whether or not EOT/EOA was used
- higher or lower percentage of manual class in home area
- higher or lower percentage of manual class in practice area
- more or less deprived home area (Carstairs, Jarman, and Townsend Indices)
- more or less deprived practice area (Carstairs, Jarman, and Townsend Indices).

The model was tested for its ability to predict discontinuation or completion for each case.

## Results

One thousand, seven hundred and nine cases were collected, 1527 completed and 182 discontinued. Of these, 1431 (1272 completed, 160 discontinued) had full social class data available.

### General observations

*Age at start* (Table 3). The subjects in the discontinued group were on average 9.8 months older than those in the completed group ( $P = 0.002$ ).

*Appliance use* (Table 4). Relatively fewer discontinued cases had been treated with fixed appliances (37.5 compared with 50.4 per cent;  $P = 0.001$ ), but relatively more had been expected to wear EOT (16.2 compared with 8 per cent;  $P = 0.001$ ).

*Orthodontic qualifications* (Table 5). Fewer discontinued cases had attended a practitioner with an orthodontic qualification (36.3 compared with 50.6 per cent;  $P < 0.0005$ ).

### Social inequality

Descriptives for the measures of inequality are shown in Tables 6 and 7.

**Table 3** Descriptives of age at start of treatment for the groups of patients.

Case group	Mean age at start (years)	SD	Median	Range	Group size	Variable missing
Whole sample	12.77	2.63	12.63	6.23–42.91	1707	4
Completed	12.69	2.52	12.60	6.23–42.91	1527	3
Discontinued	13.51	3.32	13.08	7.25–36.33	180	1
Mean difference	0.82 years					
<i>T</i> value	–3.209					
<i>P</i> value	0.002					

**Table 4** Appliance usage in the groups of cases.

	Two-arch fixed	One-arch fixed	Removable only	EOT used	Base	Variables missing
Case group	%	%	%	%		
Completed	24.4	26.0	49.6	8.0	1527	0
Discontinued	19.6	17.9	62.6	16.2	180	1
$\chi^2$			11.23	13.391		
<i>P</i> value			0.001	0.001		

**Table 5** Orthodontically qualified practitioners and discontinuation.

	Orthodontically qualified %	Base	Variables missing
Case group			
Whole sample	49.1	1706	1
Completed	50.6	1527	0
Discontinued	36.3	180	1
$\chi^2$	13.007		
<i>P</i> value	< 0.0005		

*Patients' home neighbourhood.* The discontinued group were overall from 'lower' social stratum areas. There were statistically significant differences between the two groups for all measures of inequality tested.

*Practice areas.* The discontinued group were, overall, treated in significantly 'lower' social stratum areas under all the measures tested, with the possible exception of the Jarman Index.

The dichotomized social inequality variables are shown in Tables 8 and 9, along with the *post hoc* power values. The RG social class and Carstairs Index were significant ( $P < 0.05$ ) for both home and practice areas, and the Townsend Scores for practice area only.

#### *The logistic regression analysis: models to 'predict' discontinuation*

Fixed/removable appliances ( $P < 0.0005$ ), age of patient ( $P = 0.001$ ), EOT ( $P = 0.001$ ), RG social class of home area ( $P = 0.002$ ), orthodontic qualification ( $P = 0.02$ ) and Carstairs Index of practice area ( $P = 0.022$ ) were selected. The model predicted completion correctly in 89.7 per cent of cases, but failed to predict any of the discontinued cases (Table 10). When RG social class (home area) was removed from the submitted factors, Carstairs Index (home area) was selected ( $P = 0.008$ ).

## Discussion

Discontinuation was more likely if treatment involved removable appliances only, older patients, EOT, non-orthodontically qualified dentists, patients from 'more manual classes' or more deprived home areas, and practices in relatively deprived areas.

### *Removable appliances*

The higher use of removable appliances amongst patients who discontinued agrees with other more recent reports (Murray, 1989; Richmond and Andrews, 1995). This may reflect the compliance they require, particularly if pain or speech problems are experienced in the first few days of treatment, but they may also be prescribed more often in patients whose co-operation is

**Table 6** Descriptives of measures of social inequality for the patients' home neighbourhoods.

	Mean	SD	Median	Min-max	Mean difference	<i>t</i>	<i>P</i>
<b>Percentage of manual ('lower') class heads of household</b>							
All cases	44.00	15.60	43.40	7.59–86.36			
Completed cases	43.35	15.43	42.67	7.59–86.78			
Discontinued cases	49.27	16.03	50.71	13.13–84.73	5.89	–4.556	< 0.0005
<b>Carstairs Index</b>							
All cases	–0.11	3.40	–1.14	–4.86–14.70			
Completed cases	–0.21	3.37	–1.23	–4.86–14.70			
Discontinued cases	0.67	3.55	–0.01	–4.46–13.40	0.88	–3.099	= 0.002
<b>Jarman Index</b>							
All cases	0.50	16.27	–1.65	–40.97–61.81			
Completed cases	0.18	16.27	–1.84	–40.9–61.81			
Discontinued cases	3.25	16.08	0.90	–23.57–57.14	2.992	–2.204	= 0.028
<b>Townsend Score</b>							
All cases	–0.01	3.44	–0.84	–7.39–12.41			
Completed cases	–0.14	3.44	–0.88	–7.39–12.41			
Discontinued cases	0.65	3.40	–0.21	–5.23–11.04	0.79	–2.738	= 0.006

**Table 7** Descriptives of measures of social inequality for the practice areas.

	Mean	SD	Median	Min-max	Mean difference	<i>t</i>	<i>P</i>
<b>Percentage of manual ('lower') class heads of household</b>							
All cases	42.57	16.63	42.34	7.69–86.36			
Completed cases	41.89	16.49	42.34	7.69–86.36			
Discontinued cases	48.17	16.89	50.00	7.69–84.77	6.36	–4.600	< 0.0005
<b>Carstairs Index</b>							
All cases	1.86	1.36	0.37	–5.25–18.96			
Completed cases	1.26	4.05	0.25	–5.25–18.96			
Discontinued cases	2.26	3.92	1.78	–4.62–14.06	0.97	–2.866	= 0.004
<b>Jarman Index</b>							
All cases	11.42	17.73	10.42	–37.95–61.81			
Completed cases	11.14	17.86	10.34	–37.95–58.92			
Discontinued cases	13.94	16.40	14.23	–19.05–61.81	2.81	–1.900	= 0.058
<b>Townsend Score</b>							
All cases	1.72	3.78	1.38	–8.77–11.66			
Completed cases	1.63	3.79	1.38	–8.77–11.66			
Discontinued cases	2.46	3.57	2.11	–5.23–11.66	–0.84	–2.654	= 0.008

**Table 8** Comparison of bivariate social inequality data for patients' homes for completed and discontinued cases.

	'Higher' class/ less deprived %	'Lower' class/ more deprived %	Chi- squared	Probability	Power %
<b>Registrar General's social class</b>					
Completed	51.8	48.2			
Discontinued	35.0	65.0	16.206	< 0.0005	98
<b>Carstairs Index</b>					
Completed	48.9	48.9			
Discontinued	40.6	59.4	6.276	= 0.012	68
<b>Jarman Index</b>					
Completed	50.8	49.2			
Discontinued	43.8	56.3	2.848	= 0.092	36
<b>Townsend Score</b>					
Completed	50.7	49.3			
Discontinued	43.1	56.9	3.312	= 0.069	44

**Table 9** Comparison of bivariate social inequality data for practice areas between completed and discontinued cases.

	'Higher' class/ less deprived %	'Lower' class/ more deprived %	Chi- squared	Probability	Power %
<b>Registrar General's social class</b>					
Completed	52.4	48.9			
Discontinued	38.1	61.9	11.672	= 0.001	86
<b>Carstairs Index</b>					
Completed	51.5	48.5			
Discontinued	36.3	63.8	13.374	< 0.0005	95
<b>Jarman Index</b>					
Completed	69.2	30.8			
Discontinued	63.1	36.9	2.435	= 0.119	32
<b>Townsend Score</b>					
Completed	76.3	23.7			
Discontinued	65.6	34.4	8.832	= 0.003	79

**Table 10** Results of logistic regression analysis to assess possible predictors of discontinuation.

<b>Parameter estimates</b>					
Factor	B	SEM	P	Exp(B)	95% CI (Exp(B))
Intercept	1.347	0.280	< 0.0005		
Removable appliance only	-0.655	0.186	< 0.0005	0.519	0.361-0.747
Older patient	0.585	0.179	= 0.001	1.795	1.264-2.547
EOT/EOA used	0.870	0.253	= 0.001	2.386	1.454-3.916
Registrar General's—home area lower class	0.573	0.181	= 0.002	1.774	1.244-2.529
No orthodontic qualification	-0.418	0.180	= 0.020	0.658	0.462-0.937
Carstairs Index—practice area more deprived	0.487	0.213	= 0.022	1.628	1.073-2.470
<b>Likelihood ratio tests (reduced model)</b>					
Effect	-2 log likelihood	Chi-squared	Significance		
Intercept	184.486	0.000			
Fixed appliances used?	197.267	12.781	< 0.0005		
Younger/older patient?	195.394	10.907	= 0.001		
EOT/EOA used?	194.959	10.473	= 0.001		
Registrar General's Class—home area	194.823	10.336	= 0.001		
Practitioner orthodontically qualified?	189.985	5.499	= 0.019		
Carstairs Index—practice area	190.087	5.601	= 0.018		
<b>Prediction of groups</b>	Completed	Discontinued			
Actual					
Completed	1382	0			
Discontinued	159	0			
<b>Overall success: 89.7%</b>					

*P* values are given for significance; CI = confidence interval.

in doubt from the start (Kerr *et al.*, 1994). Earlier links between fixed appliances and a desire to discontinue (Myrberg and Thilander, 1973a,b) may be a temporal effect, fixed appliances being more socially acceptable in the 1990s than in the 1970s.

#### *Age at start*

This has previously been noted as being significant (Allan and Hodgson, 1968; Haynes, 1982). Emotional and lifestyle changes in late adolescence are possible



reasons for this, but the difference in means was small and there was a very substantial spread of ages in both groups. This may be why Murray (1989) detected no such difference in her smaller sample.

### *EOT*

EOT was used considerably more in the discontinued group. This may again reflect problems with compliance, as noted previously (DHSS, 1986). Murray (1989) did not find this, but that sample was limited to one hospital unit and may reflect different circumstances of practice compared with the GDS.

### *Orthodontically qualified operators*

Orthodontically qualified operators had a lower discontinuation rate than others, even when fixed appliances were fitted to the model. This parallels Murray's (1989) finding about operator experience, and may reflect better approaches to orthodontic treatment and patient management.

### *Social inequality: does it have a direct influence?*

There are always errors when assessing social stratum by area, as not all households will fit the local trend. This may mask differences between social strata, but values and behaviour may be influenced by the peer groups within which families live.

A further problem is confounding variables. Orthodontically qualified practitioners appear to be more readily available in 'more middle class' areas (Turbill *et al.*, 1999a) and to use fixed appliances more frequently (Richmond *et al.*, 1993; Turbill *et al.*, 1999b). Fixed appliances were found to have a lower discontinuation rate in this study and also those of Murray (1989) and Richmond and Andrews (1995). This is a problem that in itself is complex. There are a number of reasons why orthodontists may prefer not to work in deprived areas, such as those areas simply being more unattractive, the expected poorer compliance of the patients, and probably the lack of scope for private practice. Moreover, the Community Dental Service will be providing an orthodontic service in some of these areas. Nonetheless, logistic regression analysis suggests that social class, and to a lesser extent practitioner qualification, do make some independent contributions to the question of discontinuation.

The mean values of all measures of inequality tested indicated an overall 'lower' social spectrum in the discontinued than in the completed cases. This is consistent with the findings of Rölling (1982) in Denmark, and may be linked to different concerns with dental appearance and function (Townsend and Davidson, 1982; Jenkins *et al.*, 1984a; Kenealy *et al.*,

1989). Poorer tolerance of complex treatments (Jenkins *et al.*, 1984a) may also be significant. These effects may be linked to poorer levels of oral care amongst the 'lower' social strata (Jenkins *et al.*, 1984b), and arguably to different cultural norms and priorities regarding appearance. Problems in appointment keeping and diet (Gratrix and Holloway, 1994; Pavi *et al.*, 1995) may also be pertinent; poor attendance or any relapse in oral care making the operator more likely to instigate discontinuation. Arguably many of these attitudes may change with time, and a new study on orthodontic outcomes and discontinuation, contemporaneous with the 2001 census, would elucidate whether this has already occurred to any significant extent. Although this investigation was low in power for some of the indices, it could be used to calculate sample sizes for a future study, which may clarify any differences in sensitivity between the measures of inequality.

Although statistically significant differences were seen between the completed and discontinued groups for most indicators of social inequality tested, they contributed no predictive power to the models in the logistic regression, although the poor prediction rate for discontinued cases may be related to their relatively smaller numbers. The RG (occupationally-based) social classification and the Carstairs Index (based on proportion of homes with unemployment, overcrowding, no car, and also RG social class IV or V head of household) were, however, selected over other indicators, which may suggest that the factors they specifically cover, e.g. skill or educational level of parents (both), and also overcrowded accommodation and car ownership (Carstairs Index), may be a little more pertinent to orthodontics than others, such as owner occupation, one-parent families, lone pensioners, or ethnic mix of the area. This may elucidate the problems of some 'lower class' orthodontic patients and/or parents, such as perhaps communication with professional personnel, access to a bathroom, and difficulties in travelling. The latter is consistent with the observations of Pavi *et al.* (1995). It is also interesting that the Carstairs Index was recently shown to be, overall, a better predictor of caries in children than the Townsend or Jarman indices (Morgan and Treasure, 2001).

Although a statistically significant model for completion was found using logistic regression, it failed to predict any of the cases who discontinued, so these findings are similarly inconclusive to those of Murray (1989). It must therefore be concluded that none of the information available at the start of treatment can reliably predict discontinuation. Although a somewhat greater proportion of patients from manual class, or deprived, backgrounds failed to complete their treatment, many did complete, just as a substantial minority of patients from higher social class, or more affluent backgrounds discontinued, and both would be influenced by

other factors such as appliance regime, patient's age and operator skills, and arguably, variations in aspirations and values between individual patients and families. What is perhaps relevant is the observation of Allan and Hodgson (1968), who evaluated their findings thus:

'Knowing a patient is more likely to react in a certain way during treatment, the orthodontist could experiment with a variety of strategies to elicit the desired level of co-operation'.

Although it is not possible to eliminate discontinuation, it is the duty of the practitioner to discuss carefully with patients and parents what they hope to gain from treatment, and the different options and levels of co-operation needed, before committing patients to treatment plans with which they may have little inclination or aptitude to comply, and that aim for goals that they are inadequately motivated to achieve. This should always be done sensitively and with regard to the vocabulary likely to be understood by individual patients and parents.

## Conclusions

Of a sample of 1709 cases, 1431 had data available on all variables under consideration. The cases were assessed to see which, if any, measures of social inequality were most associated with discontinuation of orthodontic treatment. Factors previously noted or postulated as relevant were also taken into account.

The results showed that discontinued cases were:

1. less likely to have been treated with fixed appliances
2. a little older at start, on average
3. more likely to have been asked to wear EOT/EOA/ 'headgear'
4. more often from lower social class backgrounds
5. less likely to have been treated by an orthodontically qualified practitioner
6. more likely to have attended practices in relatively deprived areas.

## Measures of social inequality

Occupationally based social classification of patients' homes may be a little more sensitive to orthodontic applications than the composite measures.

The Carstairs Index seems to be the most sensitive of the composite measures, particularly when the practice area was considered.

However, the sample sizes gave a lack of power for the other measures tested.

Although a statistically significant model was found for completion of treatment, which included social inequality:

the model failed to 'predict' the discontinued cases, so patients cannot justifiably be denied the chance of

orthodontic treatment on the grounds of social inequality, or in other words:

there is no justification for differential prescription on the grounds of social class, or material deprivation of home area ('prescription by postcode')

practitioner skill in treatment, and communication with patients of varying educational levels, may be of considerable significance in discontinuation

a prospective study, contemporaneous with the 2001 census may be indicated to further elucidate the possible effects of class and/or deprivation in the light of possible sea-changes in expectations of the population.

Patients of all kinds discontinue their treatment, and unfortunately it is likely that this will always be the case. Probably all that can be done to minimize the occurrence is to ensure that patients and parents fully understand the options, aims, implications, and likely duration of treatment at the outset, and this should form part of the informed consent process.

## Address for correspondence

Dr E. A. Turbill  
Orthodontic Research Area  
3rd Floor, Coupland III Building  
Turner Dental School  
University of Manchester  
Higher Cambridge Street  
Manchester M15 6FH, UK

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