Eur. J. Prosthodont. Rest. Dent., Vol.13, No. 1, pp 4–8
Printed in Great Britain

The Profile of Patients Referred to an Outreach Restorative Dentistry Clinic Over the Last 10 Years Has Changed

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Abstract - *The aim of the study was to compare the profile of the patients referred to a Restorative Dentistry consultant clinic at Scarborough General Hospital (SGH) in 1991 and 2001. The clinical records from 80% of a cohort of the new patients referred for consultation and who attended in 1991 and 2001 were examined. In total 55 clinical records were examined from 1991 and 84 from 2001. Data on reason for referral, time of wait before assessment and outcome of the consultation was recorded. The number of patients seen for consultation increased considerably between 1991 and 2001. Mean waiting times from the date of referral to the date when assessed trebled (p=0.016). Referral for denture problems (notably complete dentures) was the main reason for referral in 2001 (25%). Tooth wear was the most common reason for referral in 1991 (22%). It was concluded that the demand for the services of a Restorative Dentistry consultant at Scarborough General Hospital increased considerably between 1991 and 2001. This resulted in considerably longer waiting times for a consultation. In 2001 there was a greater percentage of referrals for appearance, complete dentures and implants. A higher percentage of patients in this study were referred back to their GDP for treatment as compared to other studies.*

KEY WORDS: Referral patterns; Consultant referrals; Waiting times

INTRODUCTION

Restorative Dentistry has been recognised as a speciality in the UK since 1973[1]. Consultant posts were established almost entirely in the dental teaching hospitals although attention was drawn to the important role that they are able to play within the hospital service[2,3]. Jenkins[4] felt that the creation of regional consultant posts in Restorative Dentistry would rectify a major deficiency in the specialist dental services. However, only twelve consultant posts in Restorative Dentistry were created in district general hospitals (DGHs) between 1983 and 1993[5]. The number of Restorative Dentistry consultants in the DGHs is increasing very slowly (17 posts in 2001) with the vast majority (approximately 90%) of Restorative Dentistry consultants working primarily in the dental teaching hospitals. Thus, access to the services of a Restorative Dentistry consultant is not uniform across the country and a large proportion of the population face journeys of substantial time and distance to obtain treatment or advice. It has further been shown that general dental practitioners (GDPs) were less likely to refer patients where long distances were involved[6,7] and that being elderly can be an additional barrier[8]. It is for these reasons that many Restorative Dentistry consultants who work primarily in the teaching hospitals, conduct regional clinics of varying frequency (one day a week, month or three monthly).

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This study formed part of a thesis submitted in partial fulfilment of the degree of Master of Clinical Dentistry (Prosthodontics), Distance Learning, University of London.

The number of new patients being referred for a Restorative Dentistry consultant opinion or restorative treatment has risen rapidly since the recognition of Restorative Dentistry as a speciality in 1973[7,9,10]. Restorative Dentistry consultants receive a wide variety of referrals and several studies from teaching hospitals and full time regional Restorative Dentistry clinics have investigated the patterns that exist[6,7,9–11]. Reasons for referral include treatment planning or advice, the undertaking of complex treatments, retreatments and medico-legal concerns. Certain areas of clinical management, including complete denture prosthodontics and endodontics, appear to be predominantly referred for management by the consultant rather than just a request for advice[9].

The advantages of having a treatment plan formulated by a Restorative Dentistry consultant include having a potentially more experienced clinician to outline the ideal treatment and this may avoid potential failure of treatment or even litigation. Linden[12] found that medico-legal concerns were a significant factor in a GDP deciding to refer a particular patient. Some 68% of respondents to his postal questionnaire stated that a medico-legal concern was the main reason or one of the main reasons why they referred patients to a periodontal clinic.

The aim of this study was to discern the new patient referral pattern for patients who attended a DGH outpatients clinic for a Restorative Dentistry consultation in 1991 and 2001. Only limited research into the demand or pattern of referral to restorative consultants where the clinics are based in hospitals peripheral to the main base of a restorative consultant, has been undertaken[13]. This study would give:

1) an indication of the referral pattern that exists at present in an area 70 miles from the nearest teaching

hospital, with clinics held at a four to six week frequency.

2) allow a comparison with the referral pattern that existed ten years previously, given the changing pattern of dental disease and available treatments that has occurred in the intervening years.

MATERIALS AND METHODS

Using data from the clinic log book that recorded all referred patients who had attended for a consultation since 1987, a cohort of 80% of the new patients seen on the outpatients clinic at Scarborough General Hospital (SGH) in 1991 and 2001 was identified. A cohort of 80% was used as it was not possible to obtain all the clinical records relating to those patients who attended for consultation in 1991. Some of the missing clinical records relating to the 1991 patients were untraceable whilst others had been sent for microfilming and could not be returned to SGH when the data was being collected. The total number of new patients for the relevant years was 68 for 1991 and 105 for 2001. This resulted in a cohort of 55 patients in 1991 and 84 in 2001. The records were obtained via the Medical Records Department at SGH and the original referral letter and consultants reply examined. Consent for the study was sought and obtained from the ethics committee at SGH.

The following information was recorded:

- Male/Female
- Age
- Source of referral – GDP, community dentist, another consultant, alternative sources of referral (e.g. self-referral).
- Waiting time – The time from the referral letter date to when they were seen.
- Reason for referral – This was defined as the main reason why the referring person was requesting the consultation. If the reasons were multiple, all were recorded.
- Outcome of consultation – This was categorised as to whether advice only was given or if treatment and advice were offered and in what setting i.e. at SGH or Leeds Dental Institute (LDI). Where more than one person was involved with the management, all parties were recorded.

The referral categories were derived from Callis *et al.*[7] and Ellis *et al.*[9]: Appearance, Bridges, Caries, Crowns, Dentures (partial/complete), Endodontic, Implants, Missing teeth, Pain, Periodontal, Temporomandibular joint dysfunction, Wear, Other.

The data obtained for patient age and waiting time was analysed for statistical significance using the Student t-test at the 5% level. Comparison of the categorical variables between 1991 and 2001 was performed using chi-square analysis.

RESULTS

The number of new patients seen increased from 68 in 1991 to 105 in 2001, an increase of 54%. The number of female and males referred was almost equal in 1991. However, in 2001 a greater proportion of females were referred and seen (*Table 1*).

The majority of patients in both years were referred from GDPs: 87% in 1991 and 89% in 2001. Referrals from other dental consultants were about 10% and there were virtually no referrals from community dentists (*Table 1*). The mean age at the time of consultation had increased by just over three years in 2001 but the difference was not significant (*Table 1*). The age range in 2001 was also larger than in 1991, with the youngest patient in 2001

Table 1. *Profile of the referred patients %.*

	1991 (n=55)	*2001 (n=84)*
Gender		
Male	49.1	35.7
Female	50.9	64.3
Mean age at time of consultation (years)		
Age	44.1	47.1
Age range	(11.4–77.5)	(9.0–78.9)
Standard Deviation	±16.3	±20.4
Source of referral %		
GDP	87.3	89.3
Consultant	10.9	9.5
Community Dentist	1.8	0
Other	0	1.2
Age at time of consultation %		
0–9 year olds	0	1.2
10–19 year olds	9.1	16.7
20–29 year olds	7.3	7.1
30–39 year olds	25.4	4.8
40–49 year olds	21.8	21.4
50–59 year olds	18.2	13.1
60–69 year olds	10.9	21.4
70–79 year olds	7.3	14.3
80–89 year olds	0	0
Average patient waiting times (weeks)		
1991	6.2	Range 0.05–27.6
2001	19.7	Range 3.6 –29.6

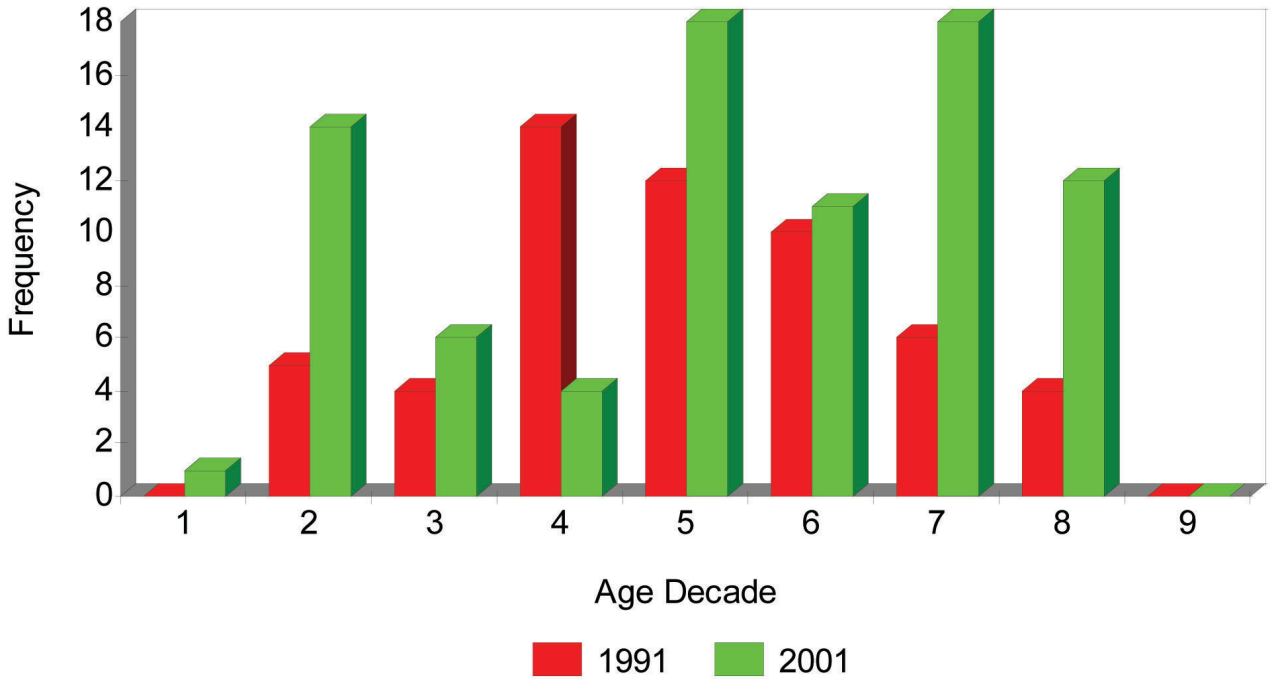

Figure 1. *Patient age distribution*

Table 2. *Referral categories.*

	1991 (%)	*2001 (%)*	*p value*
Appearance	10.9	16.8	0.276
Bridges	9.1	10.7	0.671
Caries	1.8	7.1	0.119
Crowns	1.8	3.6	0.490
Dentures	14.5	25.0	0.097
Complete	12.7	19.0	0.276
Partial	1.8	6.0	0.186
Endodontic	16.4	9.5	0.176
Implants	0.0	6.0	0.040*
Missing teeth	3.6	11.9	0.058
Other	0.0	1.2	0.365
Pain	18.2	6.0	0.012*
Periodontal	7.3	7.1	0.960
Missing Teeth	3.6	11.9	0.058
TMJ	5.5	3.6	0.549
Wear	21.8	10.7	0.046*

Other – The referral in the Other category for 2001 was for a patient who was referred for a second opinion regarding mercury and health risks in amalgam restorations. TMJ – Temporomandibular joint dysfunction syndrome.

* indicates statistically significant at $p<0.05$

being nine years old. Patients who were 50 years old or older made up 36% of referrals in 1991 whereas this increased to 49% of referrals in 2001 (p=0.092) (*Figure 1*).

The average waiting time from the date of referral to being seen on the consultant clinic more than trebled from 6.2 weeks in 1991 to 19.7 weeks in 2001 (*Table 1*). The majority of the patients seen in 1991 (85%) waited less than 10.4 weeks, whereas the majority of patients in 2001 (84%) waited more than 15.6 weeks (p = 0.016).

The reasons for referral were divided into 13 categories, though some referrals fell into more than one category (*Table 2*). In 1991 the three most common categories for referral were: wear (22%), pain (18%) and endodontic problems (16%). Dentures (15%) and appearance (11%) were other notable categories. In 2001 the three most common reasons for referral were dentures (25%), appearance (17%) and missing teeth (12%). Hence in 2001 denture referrals accounted for one quarter of all new patient referrals, with complete dentures accounting for 19% of the patients referred. Other notable referral categories included wear (11%) and bridges (11%). Between 1991 and 2001 the percentage of referrals for pain decreased by 67% (p=0.012), the percentage of referrals for wear decreased by 51% (p= 0.046), endodontic referrals decreased by 42% (p= 0.176) and referrals for missing teeth increased more than threefold (p= 0.058). Periodontal problems accounted for only 7% of referrals in both years.

Table 3. *Outcome of consultation.*

	1991 (%)	*2001 (%)*	*p value*
GDP	81.8	75.0	0.294
Consultant	10.9	9.5	0.770
Community Dentist	1.8	0.0	0.168
LDI	7.3	11.9	0.327
SGH	3.6	8.3	0.219

LDI = Patient referred for treatment at the Leeds Dental Institute.
SGH = Treatment carried out by Professor Ralph at Scarborough General Hospital.
* indicates statistical sigificance at $p<0.05$

The outcome of the consultation was divided into five categories (*Table 3*). The most common outcome in both years was for the patient to be returned to the GDP for the required treatment or monitoring (1991 – 81.8%, 2001 – 75%). The percentage of referrals to the Leeds Dental Institute increased from 7.3% in 1991 to 11.9% in 2001 and the percentage of patients undergoing treatment at SGH increased from 3.6% in 1991 to 8.3% in 2001 although these changes were not statistically significant.

DISCUSSION

The total number of new patients increased substantially from 68 in 1991 to 105 in 2001. This represents an increase of 54% between 1991 and 2001. The number of males and females seen in 1991 was almost equal. This was slightly surprising given the predominance of female referrals in other studies[6,7,9–11]. However, in 2001 the male:female ratio was more in line with other studies with 64% of new patient referrals being female patients. Women are more regular dental attenders[14] and so the net result may be a higher rate of female referral to Restorative Dentistry clinics. The average waiting time increased more than threefold between 1991 and 2001. This was despite there being a slight increase in the number of clinics from 14 in 1991 to 16 in 2001. In 1991 the average wait was 6.3 weeks whereas this had increased to 19.8 weeks in 2001. The substantial increase in average waiting time, accompanied by the increased number of newly referred patients seen on the consultant clinics, clearly indicates a substantial rise in the demand for the services of a Restorative Dentistry consultant within the Scarborough area. This is in agreement with Callis *et al.*[7] and Ellis *et al.*[9] who both found that the number of referrals to Restorative Dentistry consultants had increased substantially in the time periods that they investigated. The increase in average waiting time probably accounts for the 67% decrease in referrals for pain in 2001 as compared to 1991.

The Adult Dental Health Survey of 1998[15] indicates an increasing percentage of dentate individuals within the UK population accompanied by a change in public perceptions towards tooth loss and edentulousness[16] . These factors coupled with an increased number of treatment options being available as well as patient management having become increasingly complex may have resulted in an increased need for restorative consultant advice and treatment. Other factors may also have come into play such as the increased potential for litigation when related either to poor treatment planning, unsuccessful treatment or the failure to diagnose and carry out appropriate treatment.

There has been a pronounced rise in denture referrals with 25% of the new patient referrals in 2001 being denture related (*Table 2*). This compares with 15% in 1991 when dentures were the fourth most common reason for referral, although it was not statistically significant ($p=0.097$). Further analysis of the denture referral figures indicate that complete denture referrals were far more common than partial denture referrals in both years. This is surprising given the decrease in the numbers of edentulous people within the UK population that occurred between 1991 and 2001[15,17,18]. This differs from the results of Lamb and Walsh[11] in a study of complete denture referrals from GDPs between 1994 and 1998, which found that the number of referrals from GDPs had fallen as the number of edentulous people within the population fell. It is unclear why there has been a rise in the number of complete denture referrals in this study. Possible reasons include an increased number of difficult cases within the local population (e.g. elderly edentulous individuals with anatomical and physical factors that make treatment difficult), the fact that the consultant provided treatment for these patients himself or that today's GDPs have a lack of experience in the fabrication of complete dentures due to perceived decreased need and reduced teaching at undergraduate level[19].

One limitation of a retrospective study of clinical notes as in this study, is that there may be overlap within the categorisation of conditions due to reported treatment requirements. For instance, a patient may be concerned with appearance of some anterior crowns with discoloured margins as well as being concerned about a missing upper first premolar. This could account for some of the minor variations that are not statistically significant ($p>0.05$) that are seen between the two years in question.

Worn teeth were the most common reason for referral in 1991 with 22% of the new patient referrals but this decreased to 11% in 2001 ($p=0.046$). The appearance of teeth appears to be a prominent area of concern for the public, with 27% of dentate adults in the 1998 Adult Dental Health Survey[15] expressing dissatisfaction with the appearance of their teeth or dentures. Callis *et al.*[7] found that 35% of GDP referrals were related to the appearance of patients' teeth, which is significantly more than in this study. Conversely Ellis *et al.*[9] found that only 7.2% of patient referrals were related to appearance.

Root canal therapy was the third most common reason for referral in 1991 representing 16% of referrals. This is

in line with the studies of Callis *et al.*[7] and Ellis *et al.*[9] who both found endodontic problems to be a prominent area for referral. Periodontal referrals were a minority referral category in both 1991 (7%) and 2001 (7%). This was slightly surprising given the results of Ellis *et al.*[9], which found periodontal referrals to be the second most common reason for referral. The reason for this may well be due to the fact that the clinic is held in an Orthodontic department and, aside from referring patients to the LDI, GDPs could only be offered advice on treatment. If the only treatment offered has to be at the LDI, this would involve a round trip of 150 miles, take the majority of a day (including treatment times, parking etc.) to carry out and, due to its prolonged nature, would almost certainly involve multiple visits. This is likely to be a deterrent to both referring GDPs and patients.

Ellis *et al.*[9] indicated that 44% of the total number of referrals came with a request for treatment to be carried out within the department. Notably, in the same study, 67% of complete denture referrals and 57% of endodontic referrals came with a request for treatment to be carried out within the department. Callis *et al.*[7] found that a similar percentage of GDP referrals (43%) came with this request, of which 28% received treatment within the department.

The number of patients returned to their GDPs for treatment or monitoring was very high in both years. In 1991, this was 81.8% and in 2001 it was slightly lower at 75% (*Table 3*). A further 3% received treatment within SGH in 1991 and 8% in 2001. Some 7% in 1991 and 12% of patients in 2001 were transferred to the LDI for further treatment.

The increase in the number of referrals to Restorative Dentistry consultants (often with requests for treatment) shown by this study and the studies of Callis *et al.*[7] and Ellis *et al.*[9] has major implications as regards the number and location (based in DGHs rather than dental teaching hospitals) of Restorative Dentistry consultants needed nationally to meet this demand and to prevent an escalation in patient waiting times. This is in line with the conclusion from Wilson and Smith[13]. Investigation needs to be undertaken to clarify how much referrals have increased nationally to Restorative Dentistry consultants and to elucidate exactly what GDPs would like from the service versus what Restorative Dentistry consultants are realistically able to provide.

The role of the recently formed Primary Care Trusts (PCTs) is to commission and provide healthcare at a local level. A clear response from GDPs indicating that there is significant local demand for a more comprehensive, locally based Restorative Dentistry consultant service could result in the local PCT funding such a service.

CONCLUSIONS

Within the limits of this retrospective study, it can be concluded that the demand for the services of a Restorative Dentistry consultant has increased in the Scarborough area over a ten year period. The results also indicate that new patient referrals involving appearance and implants increased in 2001 as compared to 1991. However, referrals involving periodontal problems remained at almost exactly the same level. Complete denture referrals increased substantially between 1991 and 2001 despite there being a marked decrease in the percentage of edentulous individuals within the UK population[15,17].

ACKNOWLEDGEMENTS

We would like to express our thanks to the members of staff of the Scarborough General Hospital Medical Records Department, but especially Carole Otto for her help and assistance in obtaining the necessary patient records. We acknowledge the statistical advice received from Dr Ron Wilson.

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REFERENCES

1. Ralph, J.P. Consultant services in restorative dentistry. *Br. Dent. J.,* 1995; **179**: 188–189.
2. Consultants in Restorative Dentistry Group. Role of the consultant restorative dentist in the general hospital service. *Br. Dent. J.,* 1983; **154**: 181–182.
3. Editorial. Restorative dentistry in the hospital service. *Br. Dent. J.,* 1983; **154**: 157.
4. Jenkins, W.M.M. The restorative speciality in the hospital dental service. *Dent Update,* 1980; **7**: 353–359.
5. The Report of the Working Group on Specialist Dental Training. *Training for Dental Specialists in the Future.* London: Department of Health, 1994.
6. Basker, R.M., Harrison, A. and Ralph J.P. A survey of patients referred to restorative dentistry clinics. *Br. Dent. J.,* 1988; **164**: 105–108.
7. Callis, P.D., Charlton, G. and Clyde J.S. A survey of patients seen in consultant clinics in conservative dentistry at Edinburgh Dental Hospital in 1990. *Br. Dent. J.,* 1993; **174**: 106–110.
8. Jardine, S.J., Basker, R.M. and Ralph, J.P. Problems in restorative dentistry: who copes with them? *Br. Dent. J.,* 1995; **178**: 176–179.
9. Ellis, S.G.S., Ashley, M.P. and Deans, R.F. A survey of referrals to a restorative dentistry department in a district general hospital. *Eur. J. Prosthodont. Rest. Dent.,* 2001; **9**: 59–66.
10. Yemm, R. Analysis of patients referred over a period of five years to a teaching hospital consultant service in dental prosthetics. *Br. Dent. J.,* 1985; **159**: 304–306.
11. Lamb, D.J. and Walsh, T.F. Gender and age-related differences in the pattern of complete denture referrals from general dental practitioners. *Eur. J. Prosthodont. Rest. Dent.,* 1999; **7**: 23–25.
12. Linden, G.J. Variations in periodontal referral by general dental practitioners. *J. Clin. Periodontol.,* 1998; **25**: 655–661.
13. Wilson, P.H.R. and Smith, B.J. Comparison of restorative referrals to a district general hospital and a teaching hospital using a pilot index of Restorative Dental Treatment Need. *Eur. J. Prosthodont. Rest. Dent.,* 2003; **11**: 57–63.
14. Nuttall, N.M., Bradnock, G., White, D., Morris, J. and Nunn, J. Dental attendance in 1998 and implications for the future. *Br. Dent. J.,* 2001; **190**: 177–182.
15. Kelly, M., Steele, J., Nuttall, N., Bradnock, G., Morris, J., Nunn, J., Pine, C., Pitts, N., Treasure, E. and White, D. *Adult Dental Health Survey Oral Health in the United Kingdom 1998.* HMSO, 2000.
16. Bradnock, G., White, D.A., Nuttall, N.M., Morris, A.J., Treasure, E.T. and Pine, C.M. Dental attitudes and behaviours in 1998 and implications for the future. *Br. Dent. J.,* 2001; **190**: 228–232.
17. Todd, J.E. and Lader, D. *Adult Dental Health 1988.* HMSO, 1991.
18. Downer, M.C. The improving health of United Kingdom adults and prospects for the future. *Br. Dent. J.,* 1991; **170**: 154–158.
19. Clark, R.K.F. The future of teaching of complete denture construction to undergraduates. *Br. Dent. J.,* 2002; **193**: 13–14.