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Aspects of Dentistry

Paul Bramley
John Bulman

Based on working papers of the Royal Commission on the NHS

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ASPECTS OF DENTISTRY

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EDITORS' INTRODUCTION

In chapter nine of its report, the Royal Commission on the National Health Service reviewed the development of NHS dental services, assessed ways in which NHS dental care could be improved and commented on possible future changes in the pattern of treatment.* The papers reproduced here were written as background material for the Royal Commission discussion on NHS dental services. The first was written in 1977 by a member of the Royal Commission, Professor Paul Bramley, professor of dental surgery at Sheffield University, and the second was written for the Royal Commission by Dr. John Bulman, senior lecturer in community dental health at the London Hospital Medical College. The latter has been edited and updated since the publication of the Royal Commission's report. They complemented a wide variety of material made available to the Commission on this subject, through evidence submissions, discussions with experts, and other papers prepared by the secretariat, members and specialists. The views expressed in the papers do not necessarily reflect the views either of the Royal Commission or of the King's Fund.

This is the thirteenth in a series of project papers based on the background papers of the Royal Commission on the NHS, published by the King's Fund Centre. We are grateful to King Edward's Hospital Fund for London for giving us a grant to enable this series to be published, and to the Polytechnic of North London where this project has been based.

Christine Farrell
Rosemary Davies

* GREAT BRITAIN, PARLIAMENT. *Report of the Royal Commission on the NHS* (Chairman Sir Alec Merrison) London. HM Stationery Office 1979. *Cmnd 7615.*

DENTAL HEALTH Paul Bramley

NEED

The widespread, indeed almost universal, prevalence of the two major causes of tooth loss, caries and periodontal disease, has been fully documented in two government social surveys, *Adult Dental Health in England and Wales* (Gray et al, 1968)[7] and *Children's Dental Health in England and Wales* (Todd 1973).[17] A few examples suffice to make the point that there has been a failure to contain dental disease.

Thirty seven per cent of the population of England and Wales over the age of 16 have no natural teeth. At the age of 5 years, 29 per cent were caries-free and 31 per cent had five or more decaying teeth. At the age of 14 years, only 4 per cent were caries-free and in 75 per cent five or more permament teeth were affected. Periodontal disease affects 75 per cent of 16–34 age group and 90 per cent of those over 35 years of age.

DEMAND

Demand and need for dental care was the subject of a Nuffield Provincial Hospitals Trust study (Bulman et al, 1968) [1] where the towns of Darlington and Salisbury were studied.

The statistics on need for dental treatment were similar to those in the national surveys, but they far exceeded the demand for treatment. Patients' self-assessment of their own oral health bore little relationship to the actual oral state. Most of the adult sample were totally unaware of the existence of periodontal disease. One adult in five in Salisbury and one adult in ten in Darlington claimed to have visited a dentist regularly during the previous five years. Two types of attitude accounted for the low uptake of dental care: firstly the dentist was some-one to be visited with toothache, and to be avoided except in the direst emergency, and secondly those who were aware of the need for

regular dental visits and did not attend because they gave oral health a low priority, or were discouraged by fear.

Are present demands being met?

Although *Which* (Consumers Association 1975)[18] found that its members were generally satisfied with dental treatment under the National Health Service, there is evidence of deficiencies.

The deficiencies occur in the following areas:

1 Inability to get treatment at all in some remote areas.
2 Inability to get certain items of treatment in the NHS. This paradoxically might occur in well-dentisted areas.
3 Delay in getting appointments.
4 Problems of out of hours care for emergencies
5 Quality of care.
6 Patients' charges.
7 Deprived categories, and long-stay patients in hospital.

How far is the National Health Service meeting the need?

The 1968/73 *National Adult and Children's Dental Health Surveys* were the first of their kind and form the only national epidemiological base-line we have. It is not possible, therefore, to make any direct quantitative comparisons of overall dental health pre-1949 with the situation twenty or so years later, although the five-yearly surveys of the Department of Education and Science indicate a considerable improvement in the dental health of five-year olds.[5] There is, however, indirect evidence (Howe 1976)[8] that 25 years of free or low-cost dental treatment have produced a considerable general improvement.

The annual report of the Dental Estimates Board for England and Wales (1975) gives an abundance of facts and figures about the general dental service over the last ten years. The work output per

dental surgeon has considerably increased and the ratio of filled to permanent teeth extracted has moved from 2.99 in 1965 to 5.12 in 1975, indicating a shift from extraction to conservation. Relatively more is now being spent on periodontal care, orthodontics and more advanced conservation, and relatively less on dentures, routine conservation and surgical treatment.

Further surveys of the 1968/73 type should take place at about 10 year intervals*. The following quotation is taken from the 1973 Children's Dental Health Survey and indicates the untreated dental disease in children of various age groups:

TABLE 1 Children with untreated dental disease

Children (per cent) with untreated dental disease	Age (years) 5	9	14
Caries	63	76	62
Periodontal disease	47	78	74
Malocclusion	17	55	28
Needing some dental attention	79	96	90

'Despite extensive and increasing treatment, both for children and adults, there is still a daunting amount of untreated disease.'

HOW IS TREATMENT PROVIDED IN THE UNITED KINGDOM? (1977)

General dental practice 13 500 dentists in the general dental service provide general dental services to adults and children as independent contractors. It is estimated that about 10 per cent of their time may be given to treatment under private contract. Twelve dentists are full time salaried employees and work in health centres doing similar work.

* OPCS repeated *Adult Dental Health in England and Wales* Survey in 1978, which is to be published in 1980. Some preliminary findings are displayed in the report of the Royal Commission on the NHS (table 9.2).

Community service 1 850 whole time equivalent salaried dental officers in the Community Service provide examination and general dental services, including preventative work, to school and pre-school children, expectant and nursing mothers.

Hospital service Dentists working in hospitals have a similar career structure and conditions of service to doctors and are on a part-time or full-time salary basis. They provide consultant specialist services; comprehensive treatment for long-stay patients and dental treatment for short stay patients where it has relevance to the medical condition. There are 380 whole time equivalents employed either as consultant dental surgeons or consultant orthodontists and there are about 700 whole time equivalents of staff in training and supporting grades.

Dental teaching hospitals There are seventeen in the United Kingdom and they also provide a service allied to their teaching function, both of a generalist and specialist nature.

Manpower

Dental surgeons:	20 000 names on the Dentists Register
Dental auxiliaries:	431 enrolled.
Dental hygienists:	809 enrolled.
Dental surgery assistants:	20,000 (estimated).
Technicians:	429 employed in the NHS in addition to an unknown number working in private practices and commercial laboratories.

Dental Surgeons. The Teviot Committee (1944)[15] recognised that although the dental health of the population was very poor, the demand for treatment was also exceedingly low. They also noted the disproportionate number of elderly dentists and that low

recruitment was unable to replace those due to retire. The removal of the financial barrier in 1948 increased the demand for dental services and stimulated recruitment to the profession. In 1948 no attempt was made to influence the distribution of dentists over the country. Within the first years of the service the demand for dental treatment was more than twice the predicted rate (Richards 1971).[13] In 1956 the McNair Committee recommended an expansion of training facilities from 600 places to the present 950 places.[12] This has not only increased the number of registered dentists from 16 000 to over 20 000 but has substantially lowered the average age of practising dentists. The improvement of the uptake of dental care and the improved dental manpower situation are considerable achievements. Estimates suggest that numbers on the Dentists Register would increase to 24 000 by 1990, 27 000 by the year 2001 and to 33 000 by the year 2015 *(British Dental Association Working Party Report on Dental Education,* 1976)

The education and training of dental students takes place in 17 universities and associated dental hospitals in the United Kingdom. The duration of the course is between four and a half to five years, after achieving appropriate A-level science passes. For the past few years, it has been possible to fill university places with well-qualified candidates, although it is well-known that the recruitment market for dentistry has been a fickle one in the past.

Dental auxiliaries. Dental auxiliaries are permitted to carry out simple routine dental procedures in the hospital and community service. Sixty students are admitted annually to a two-year course to the only training school at New Cross General Hospital. There are at present about 431 persons on the Auxiliaries Roll. If present conditions remain steady, it is estimated by the General Dental Council that 1 170 would be on the Roll by the year 2001.

Dental hygienists. To the prescription of dental surgeons, dental hygienists carry out scaling and polishing of the teeth and other preventative procedures. Training is of approximately 12 months

duration and takes place in nine of the dental schools, and also in the armed services. There are at present about 809 on the Hygienists Roll with about 100 training places available. If present conditions remain steady, it is estimated that 3 200 will be on the Roll by the year 2001 (GDC). There are no problems in recruitment.

Dental surgery assistants. These ancillaries play a very important role, assisting the dental surgeon at the chair side. There is at present no register or roll for dental surgery assistants. The majority receive their training in service with a dentist. Some also have the assistance of night school or day release to colleges of further education or correspondence courses. A minority receive full-time training in the dental schools.

Dental technicians. Dental technicians carry out laboratory procedures in support of the chair side work of the dentist. There are 429 directly employed by the NHS and a far greater but unknown number, possibly about 5 000, employed by general dental practitioners and commercial laboratories. Training is in service together with day release courses or night school at colleges of further education. Approximately 140 pass the final City & Guilds examination every year.

OBJECTIVES OF DENTAL HEALTH SERVICES

The overall aim must be to retain a healthy functional dentition for life by preventing what is preventable, at a reasonable cost-effective level, and by containing the remaining disease by efficient use and distribution of treatment resources.

Factors hindering the attainment of the objectives

A NEGLECT OF PREVENTION

1 Community

'Despite irrefutable evidence that fluoridation (of water supplies) can halve dental decay in children, at a fraction of the cost of dental treatment, most governments have failed to act on fluoridation because a small minority of people are still opposed to it, either as a tampering with natural supplies or out of an unfounded fear of unforeseen side effects. Among the three countries that have acted on fluoridation, the Irish case is particularly interesting because the central government, instead of resigning itself to the difficulties and delays involved in tackling fluoridation area by area, passed a single national law (since upheld by the courts as constitutional) giving the Minister of Health responsibility for introducing it by steps on a national basis. Surely other governments should seriously consider following the Irish example. To employ expensively trained people in the repair of decay that could have been cheaply prevented is a waste of precious manpower.' (McKinsey and Co, 1975).[11]

Approximately four per cent of the water supply in England and Wales is fluoridated. One of those areas is Birmingham which was fluoridated in 1964. The following figures from the Community Dental Service bring home the practical effects. (Whitehead, 1976)[19]

TABLE 2 Dental Health in Birmingham 1964 and 1973

	Extractions Temporary Teeth	Extractions Permanent Teeth	Number of general anaesthetics	Emergency attendances for relief of toothache
1964	44 410	13 429	22 628	10 268
1973	13 317	6 107	5 924	2 385

Over this period there have been no changes of significance in staffing numbers, the numbers of population at risk or in clinical policy.

The national level of dental care is maintained in naturally fluoridated Hartlepool by half the national number of dentists per unit of population.

The *report of the Committee on Child Health Services* (1976)[2] deals in more detail with fluoridation and other preventative measures and also with the complementary area of oral health education, giving some of the more important references to a voluminous literature.

A working party on Preventive Dentistry (HMSO 1973)[20] made recommendations on different methods of fluoride administration on the basis that the best means — fluoridation of public water — was not politically possible at that time. Some of its conclusions as public health measures were conceptually preposterous.

2 Individuals

Preventive dentistry is emphasised in the dental schools but the item of service payment does not encourage the use of preventive measures in general dental practice and, indeed, certain preventive treatments are virtually unavailable in the general dental service. More long term research is required to establish the efficacy of some present individual methods of prevention (Jackson 1974).[9]

Shortage of dental hygienists

Dental hygienists not only have an important role to play in the prevention of dental caries, but also in the prevention of periodontal disease. The working party on recruitment and training of dental hygienists (HMSO 1974)[20] gives a clear picture of the present position and suggests that a large expansion of numbers is urgently needed to give one hygienist to every four dentists. The British Dental Association (Report of the working party *Dental*

Care for the Community 1972) suggests that the ideal ratio is 1:2. Recommendations, short, medium and long term, are made for improving the output of this type of ancillary worker, to achieve a target figure of 2 500 hygienists by 1985.

B PROBLEMS IN THE DELIVERY OF TREATMENT

1 Manpower

That there is an overall shortage of dentists in the United Kingdom is undoubted in the present situation of the failure to use water fluoridation, and in the present early stages of the use of ancillary workers.

International comparisons, while interesting, do not give precise help with regard to computing a particular country's need for dentists.

TABLE 3 Population per dentist

Norway	1 162
Sweden	1 219
West Germany	1 960
USA	1 960
France	2 439
UK	3 448
Netherlands	3 846
Spain	10 000

Source: World Health Organisation 1971.

There is a national shortage of trained dental technicians, particularly in the more specialised areas of practice, such as orthodontics, advanced conservation and maxillofacial surgery. It is recognised that both recruitment and standards of training need to be improved and consultations are in progress between the profession, the Department of Education and Science and the Department of Health and Social Security.

2 Distribution of dentists

Whereas the distribution of doctors in general practice is reasonably even, there is a gross inequality in the distribution of dentists, both from region to region and also within regions. The following table is taken from Lennon (1976).[10]

TABLE 4 Population per doctor and per dentist

Population per doctor in general practice	Region	Population per dentist in general practice
2 408	South East	3 176
2 559	North West	5 115
	Area	
2 534	Chester	2 063
2 615	Bootle	10 166

Improved oral health standards (Gray 1970)[7] are associated with better manpower ratios, though public awareness and the provision of services are part of a cart and horse situation.

In favourably endowed areas, the social class gradient in the uptake of treatment is reduced. That this is probably due to shortage of dentists rather than attitudes to treatment of manual workers was supported by investigation in two adjacent areas in the North West (Robinson 1975)[14]

Planning to meet the needs for dental manpower requires the assembly of many facts and assumptions. This has not yet been seriously undertaken and will require considerable expertise and research.

3 Method of payment to general dental practitioners

The present item for service payment puts a premium on quantity rather than quality of restorative work. It does not reward time spent on prevention of dental disease which is an essential part of higher quality dental care. Unfortunately, a method of payment has not been devised where a high output is associated with high quality. Most salaried service experience in dentistry is of much lower output but substantially no improvement in quality. Experiments should be undertaken to compare the clinical results and financial implications of altering the method of payment.

4 Dental equipment

The high cost of dental equipment means that many practices are not equipped in the most up to date and efficient manner. Some financial incentive should be found to encourage dentists to equip or re-equip appropriately.

5 Patients' charges

The present system of charges penalises the regular attender.

WHAT POSITIVE STEPS CAN BE TAKEN?

The results of the rise of epidemiological techniques as applied to dental disease and dental care have progressively moved the dental profession to think of themselves as a body of members accepting a responsibility to society for an important part of public health care (Editorial, BDJ, 139.1 1972).[6] Attitudes to the use of certain classes of ancillary workers have become more liberal in the last 10 years. Preventive measures are now a practical and economic issue. The time is now right to think in terms of a strategy for the relief of dental need which differs from an individualistic response of a cottage industry to meet perceived individual demand.

We can consider manpower in terms of shoring up the present situation in order to satisfy existing demand and do nothing to stimulate the awareness of the advantages of dental health which would inevitably increase manpower problems.

However, dental care is probably one of the few areas in the Health Service which is ready for a root and branch investigation which could result in a great improvement in public health, without necessarily involving an enormous extra expenditure in manpower and financial resources.

A strategy for dental care would probably need to consider the following components:

1 The reduction of need by the wholehearted application of proved preventive measures, the chief being fluoridation of water supply.

2 Investigation and application of effective health education methods.

3 Prediction of the effect of preventive measures and health education on the remaining treatment load and what effect this would have on the style and balance of treatment of adults.

4 Identification of priority groups and the planning of progressive care.

5 The establishment of the appropriate use of various types of ancillaries and their mix in particular care situations.

6 Methods of remuneration in practice which would retain individual enterprise, enthusiasm and involvement.

7 Manpower requirements in the various categories.

8 Education and training requirements.

9 The economics of proposed change in the light of national economic growth and distribution of resources.

Reorientating the attitudes of public and profession to a different philosophy of dental care would be no mean task. The problems of producing a sound practical plan will require the time, expertise and research which the Royal Commission may feel inappropriate to its necessarily broad brush approach to the problems of the National Health Service. My own view is that the Royal Commission in its report should make positive responses to the problems raised in evidence and indicate the opportunities for development of a cohesive strategy that exist, and that such a strategy should be investigated in depth by an independent body set up for that sole purpose.

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NATIONAL HEALTH DENTAL SERVICES John Bulman

HISTORY

The provision of oral health care for adults in the United Kingdom on a community basis, with at least part of the cost being met from sources other than the patients' own funds, dates from the National Health Insurance Act of 1924. Coverage under this Act was, however, very limited. Dental care was classed as an additional benefit, and as such was only available to those insured through 'Approved Societies' or branches which were found on valuation to have a disposable surplus of funds. Furthermore, members were not normally entitled to such benefits until January of the fifth year after they had joined the insurance scheme. Even then the procedure was cumbersome. The member had to apply to his society for a dental letter, armed with which he then had to seek out a dentist willing to treat him under the terms of the Act. After examination, the dentist then had to submit his treatment plan for approval, and would not (normally) commence treatment until such approval had been received. Full dentures could normally only be provided not less than three months after removai of all teeth. If they were provided earlier, it was at the dentist's own risk.

Although benefits varied, the societies originally paid in general the full cost of all 'operative' treatment (excepting crowns and dentures), and not less than half the cost of dentures. Before 1926 the scale included scaling at 5s/0d, simple fillings at 5s/0d, contoured fillings at 7s/6d and crowns at one guinea. Extractions with no anaesthetic cost 1s/0d, with anaesthetic, 2s/6d for up to three teeth and 1s/6d extra for four to six teeth. For more than six teeth an extra 1s/0d was paid. These fees were increased after 1926; for example, scalings and simple fillings went up to 7s/6d. During the depression, the societies became responsible for half the cost of all treatment, but if the whole cost did not exceed 10s/0d, the society paid the full fee, and they also paid not less than 10s/0d when the total cost exceeded that amount.

Arbitration facilities were provided by five regional dental officers in England, and one each in Wales and Scotland. Existing records show that the bias was very much in favour of extraction rather than restoration.

Near the end of the scheme, when 21 million people were entitled to NHI sickness benefits, only 14 million people were entitled to dental additional benefits and of these only 6 per cent (approximately 850 000) claimed them.

In 1935 six permanent teeth were extracted for every permanent filling under the scheme, and one set of full upper and lower dentures was provided for every 1.6 permanent teeth filled. By contrast, in 1976 NHS general dental practitioners filled six permanent teeth for every permanent tooth extracted, and fitted one full denture set for every fifty permanent teeth filled.

A similar pattern was discernible in the oral care of children at this time. In 1938, 1 390 218 children were treated by the school dental services in England and Wales, representing 65 per cent of those thought to be in need of treatment. Just over one and a quarter million permanent teeth were filled and 609 631 extracted. This gave a ratio of one permanent tooth extracted for every 2.1 permanent teeth filled. For deciduous teeth, 113 338 were filled and nearly two and a half million extracted, giving a ratio of one filled for every 22 extracted. By 1945 the ratios were, for permanent teeth: one extraction per 3.1 teeth filled, and for deciduous teeth: one filling per 11 teeth extracted. In 1976 (England only) the ratios were 1 permanent extraction per 6.4 teeth filled and 1 deciduous extraction per 1.3 teeth filled. It is interesting to note that this improvement has been achieved with a less favourable whole-time equivalent school dentist to school population ratio in 1976 (1:6900), than there was in 1938 (1:5780). The pre-war figures do, however, hide the fact that in some areas of the country the service was very good, whereas in others it was very bad.

In terms of dental disease itself, there is evidence available from national dental surveys and similar sources to suggest that in terms, for example, of dentition life-expectancy the situation is improving significantly. At the time of the 1968 national survey the average dentition life-expectancy in England and Wales was fifty years. By 1978 it had increased to fifty-five years.

MANPOWER

(a) Dentists

The number of dentists registered in the United Kingdom has increased from 13 819 in 1925 to 21 237 in 1980. However, the number actually practicing in 1976 as opposed to registered ie eliminating those retired or working abroad) has been estimated at 17 100 (Scarrott, Table 2). Of these, probably four-fifths hold NHS contracts as general dental practitioners, just over one in ten works for the community dental service (salaried) and one in twenty works as a hospital dental officer. This leaves a further one in twenty employed outside the NHS, in the universities, armed forces or full-time private practice.

TABLE 1 Number of dentists registered in the UK 1920 – 1980

Year	UK	Commonwealth	Foreign	Total
1920	5 397	37	21	5 455
1925	13 762	60	33	13 819
1930	14 301	55	25	14 381
1935	14 360	53	26	14 439
1940	14 778	63	191	15 032
1945	15 178	68	176	15 422
1950	14 712	72	268	15 052
1955	15 198	234	261	15 693
1960	15 206	600	196	16 100
1965	15 667	874	300	16 841
1970	16 349	866	301	17 516
1975	17 583	976	331	19 160
1980	19 720	1092	425	21 237

TABLE 2 Estimated number of practising dentists

	Dentists on Register (start of year)	Percentage aged under 65(1) (2)	Percentage with addresses in UK (2)	Estimated number of practising dentists	Estimated population per practising dentist
1970	17 516	89.5	95.5	14 950	3 700
1971	17 598	89.5	95.5	15.050	3 700
1972	18 146	90.0	95.6	15 600	3 600
1973	18 540	90.5	95.6	16 050	3 500
1974	18 756	91.4	95.7	16 400	3 400
1975	19 160	91.4	95.6	16 750	3 300
1976	19 543	91.6	95.4	17 100	3 300
1977	19 956	91.5	95.2	17 400	3 200
1978	20 383	91.6	95.1	17 750	3 100

(1) January 31

(2) Source GDC

In terms of dentist population ratio, this gives one practising dentist for every 3 100 head of the population in 1978. However, if NHS general dental practitioners alone are considered, the dentist population ratio falls to 1:3934 in the same year. Within the National Health Service there are about two general medical practitioners for every general dental practitioner. Comparison of these ratios with those obtaining in other developed countries shows that in terms of dentist:population ratio we have for example fewer dentists than Scandinavia, USA, Japan, France, Greece, West and East Germany, New Zealand, Poland and Canada, but more than the Netherlands, Israel, Yugoslavia, Ireland or Belgium.

TABLE 3 NHS general dental practitioner : population rate 1964–1978 in Great Britain

1964	1 : 4 529
1968	1 : 4 595
1972	1 : 4 398
1976	1 : 4 104
1978	1 : 3 934

(b) Dental Hygienists

The Roll of Dental Hygienists was opened by the General Dental Council at the end of 1957 for holders of the Ministry of Health (MOH) Certificate of Proficiency in Oral Hygiene. This was superceded in 1962 by the Certificate of Proficiency in Dental Hygiene awarded by the Central Examining Board for Dental Hygienists. In this year it was recorded that 379 MOH Certificates had been awarded, and that of the recipients 35 per cent (132) were still enrolled, 18 per cent (68) had lapsed and 47 per cent (179) had never enrolled. It should be noted however, that 54 per cent (203) were working in the armed forces and were thus not required to enrol as a condition of their employment.

TABLE 4 Number of enrolled dental hygienists 1961–1979

	1961	1966	1971	1976	1979
GDP	35	109	271	481	717
Hospital	11	48	50	65	116
Local authority[1]	14	22	22	41	79
Other [2]	45	90	152	293	318
Total	**105**	**269**	**495**	**880**	**1 230**

Notes

1 After 1974 dental hygienists employed by local authority are those employed in the community dental service.

2 'Others' include dental hygienists in the armed forces overseas as tutors and not employed.

Of the 1 461 who had received the Examining Board Certificate up to the end of 1977, 88 per cent (1 280) enrolled on qualifying. The total enrolled at the end of 1979 was 1 230, trained at eleven civilian and three armed forces schools of dental hygiene. It is estimated that at the current rate of growth there will be 3 200 hygienists working by 2001. Of those enrolled in 1978, 989 were women and 25 men. The figures indicate a current annual increase of the order of 10 per cent with annual increases of about 15 per cent for those working in general dental practice, 5 per cent for those working in the hospital service and remarkably fluctuating levels for those working in the community service. These latter rates would seem to reflect to some extent the new approach to prevention and the treatment of periodontal disease within the profession.

(c) **Dental Therapists** [previously known as dental auxiliaries]

Dental therapists are trained at only one school, and their Roll was opened in mid-1969, although the first students completed their training in 1962. By 1977 861 certificates had been awarded, and

58 per cent (496) of the recipients were enrolled. There are only 60 training places available each year and on average 55 certificates are awarded annually. At current rates it is estimated that there will be 1 170 therapists enrolled by 2001. No constant pattern of rates of increase is discernible due possibly in some measure to the effect of married women now beginning to return to work after raising families. The percentage of trained personnel no longer working as therapists appears to be high, but in fact compares not unfavourably with that seen in occupations of a similar social grading for young women.

TABLE 5 Numbers of dental therapists 1971–1979

	1971	1973	1975	1977	1979
Hospital	7	24	25	19	27
Local authority	218	242	304	367	385
Other	55	71	94	99	117
Total	**280**	**337**	**424**	**485**	**529**

ORAL DISEASE AND DENTAL CARE

It is virtually impossible to chart the changes in dental health over the years with any accuracy simply because until recently dental disease was, and to a large extent still is, measured using entirely subjective assessments of the severity or extent of the disease process. Thus not only was no comparison possible between data provided by different observers, but there was also no guarantee that the same observer would return consistent results if re-examining any given population group. Tooth loss thus becomes the most reliable yardstick with which to measure variations in oral disease and dental care.

Table 6 provides tooth-loss data derived from national surveys carried out in England and Wales (1968 and 1978) and Scotland (1972) by the Office of Population Censuses and Surveys. The latest figures from the 1978 survey of England and Wales are also included.

TABLE 6 Tooth loss in England, Scotland and Wales. Percentage edentulous by age

Age	Scotland (1972) %	England (1968) %	England (1978) %
16–24	2	1	0
25–34	13	7	3
35–44	35	22	12
45–54	54	41	29
55–64	78	64	48
65–74	86	79	74
75 –	89	88	87
All ages	44	37	29

The results show that in terms of tooth loss, oral health is generally poorest in Scotland and best in England. Within England, London and the South East is the most favoured region with, in 1968, an overall edentulous prevalence in the 16 and over age-range of only 28 per cent compared with 34 per cent in the Midlands and East Anglia and 46 per cent in the north. A more detailed study of two communities in 1965 gave edentulous prevalences of 42 per cent in Salisbury (South-west England) and 51 per cent in Darlington (North England).

In a national survey by the Office of Population Censuses and Surveys in 1973 it was reported that 50 per cent of children aged 15 in Wales had lost teeth through dental caries, compared with 43 per cent in the North of England, 40 per cent in the Midlands and East Anglia, and only 19 per cent in London and the South East.

Clear evidence exists to show that a social gradient exists both in the prevalence of oral conditions and in the uptake of dental services. Table 7 provides edentulous data on a national scale (1968, 1972), and Table 8 provides mean untreated decayed and filled teeth data for adults in Salisbury and Darlington which indicate not only a disease gradient but also a gradient of reluctance to seek

conservative dental care. Thus the social class I (professional) group in Salisbury had on average nearly nine filled teeth per person compared with only 0.3 filled teeth per person in social class V (unskilled manual worker). That this phenomenon still exists even among those who have never known any treatment system other than the NHS since leaving school, is shown by the fact that among those aged 15 to 29 in 1965 the social class gradient for decayed and filled teeth still existed.

TABLE 7 Tooth loss in England, Scotland and Wales. Percentage edentulous by social status (age 16+) 1968

Social class	North	Wales & SW	Midlands & E. Anglia	London & SE	Scotland (1972)
	%	%	%	%	%
I, II, III non-manual	29	36	29	21	33
III manual	43	41	28	26	41
IV & V	57	49	41	37	53

TABLE 8 Mean decayed and filled teeth by social class. Salisbury and Darlington 1964. Age 16+

Social Class	Salisbury		Darlington	
	D	F	D	F
I	0.1	8.6	1.0	4.4
II	0.7	6.1	0.8	4.7
III non-manual	0.6	4.0	0.8	3.3
III manual	1.0	2.5	1.3	1.5
IV	1.2	2.0	1.1	1.2
V	0.8	0.3	1.5	0.0

When assessing the quality of dental care as opposed to the quantity, the main problem is one of dimension. The success of a dental

restoration or a course of treatment for periodontal disease lies not so much in the elegance of the filling or the diligence of the treatment regimen but rather in how long the life of the tooth is preserved. Thus time is the critical factor. It follows that one of the best criteria for assessing the quality of dental care is tooth or whole dentition life expectancy. This has the added advantage of being derived from objective data – the ages of the subjects and the number of teeth missing at that age – and also solves the problem of assessing the value of, say, a perfect restoration in a tooth supported by a badly diseased periodontium.

International comparisons have proved to be difficult to obtain, owing to the problem of finding comparable data. One exception is Sweden, where data are now becoming available on the first years of the National Dental Health Service. In 1975 there were 3 326 dentists working in the Swedish General Dental Practitioner Service and 3 229 dentists in the Community Dental Service. Both services treat adults. A total of 2 300 000 adult patients (aged 17+) were treated by general dental practitioners and 500 000 adults in the Community Dental Service. This represented 44 per cent of the adult population of Sweden. In comparison, in England in 1975, 11 206 dentists completed 25 904 000 courses of treatment. Scottish figures indicate that there were 1.5 courses of treatment per patient there, so if this factor is applied to the English figures we have 17 269 000 patients, or each dentist treating 1 540 patients, compared with 665 in Sweden (including children), 17 269 000 represents 48 per cent of the English adult population. It should be noted that about one and a half million children are treated in the Swedish Community Dental Service as well as adults.

In Sweden the average cost per patient in 1975 was 765Kr in general dental practice. The overall average was 750Kr, or about £88 per patient. Forty-four per cent of the total cost went on crown and bridge work. Patients pay 130 to 160Kr (on average £15.25–£19.00) compared with about £1 on average in England.

The *per capita* cost for the total Swedish population was about 300Kr or about £35. This compares with £5 per head for Great Britain in 1975. Per capita expenditure on dental care in the USA in 1976 was $39.38 per person: 81 per cent from private insurance and 5 per cent from government funds.

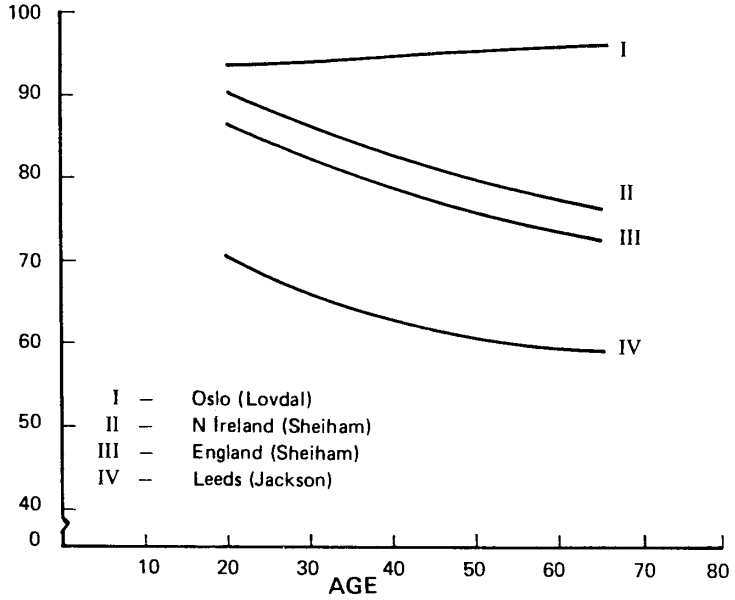
TABLE 9 Comparison of treatment patterns. Sweden and England 1975

	Sweden		England
	Community Dental Service	General Dental Service	General Dental Service
Total dentists	3 229	3 226	11 206
Dentist: extraction ratio	1: 35.5	1: 136	1: 508
Dentist: filling ratio	1: 248	1: 1 588	1: 2 715
Dentist: denture ratio	1: 9.3	1: 41	1: 131

In Sweden considerably more crown, inlay and bridge work is undertaken than in England. This to a large extent could account for the fact that the average Swedish GDP only completed half the number of restorations achieved by his English counterpart. Clearly, more dentures are being made in England per dentist and more teeth are being extracted. Figure 1 indicates that in terms of dentition life-expectancy England compared unfavourably with sample groups from Norway and USA. However, our younger population compared far more favourably with our older population, suggesting that a relative improvement is occurring. Data for 1978 comparison are not yet available.

Figure 1:

Total tooth life-expectancy expressed as a percentage of the total tooth life-expectancy of U S employed persons (Klein)



Finally, Table 10 shows a steady improvement in output per dentist within the NHS over recent years. The table indicates that not only output but also the pattern of treatment is improving, with more conservative work being undertaken and less extraction and denture work.

TABLE 10 Average treatments per dentist in the general dental service Great Britain 1963 to 1977

	1963	1968	1971	1974	1977
Courses of treatment	1 521	1 881	1 988	2 209	2 263
Examinations	1 291	1 657	1 759	1 927	2 042
Permanent teeth filled	2 377	2 615	2 714	2 658	2 608
Deciduous teeth filled	162	221	247	255	207
Crowns	12	26	25	49	75
Permanent teeth extracted	921	759	674	560	448
Deciduous teeth extracted	175	189	186	177	144
Dentures supplied	148	164	160	135	134
Dentures repaired	121	123	108	91	78

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National Health Service
dental services
United Kingdom
service provision

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