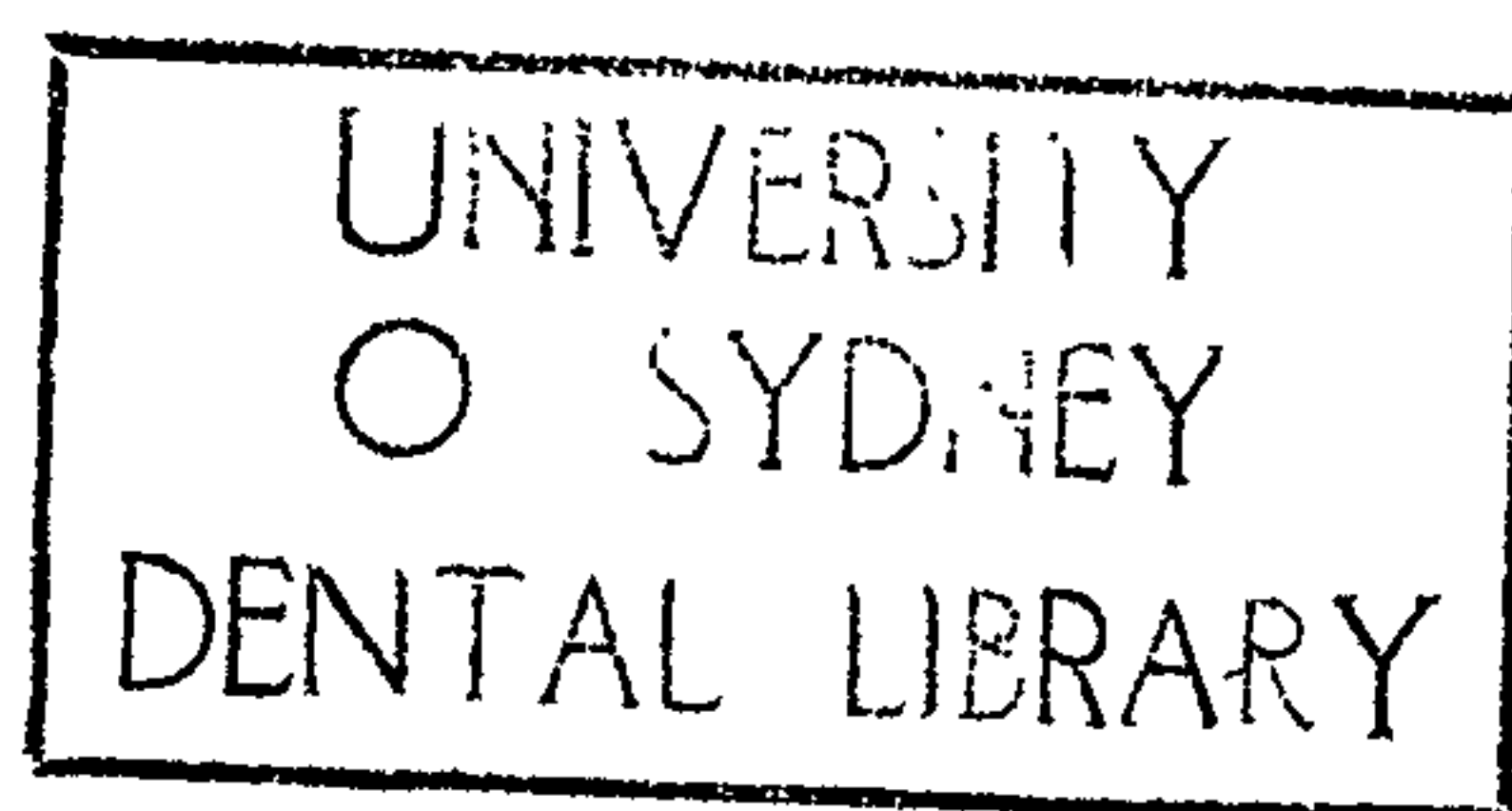


QUALITY ASSURANCE
IN DENTISTRY

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(i)

SUMMARY

The aim of this treatise is to examine the development of systems of health care review and their application to dentistry.

The history of quality assurance in health care is centred, for the most part, in the United States of America where the influence of government, professional associations and health funding bodies has been very significant. The evolution of methods of assessment of the quality of care is described and examples given of the translation of these methods to dentistry. Particular emphasis has been given in this discussion to the use of self assessment and record audits as alternatives to the traditional concentration on direct clinical assessment of dental treatment. The importance of utilising explicit criteria and established standards in order to improve the validity of assessments is illustrated and examples applicable to dental practice are given. The need for sound selection of review topics is outlined and the part played by patient satisfaction surveys in the review process is described.

(ii)

Inherent in any satisfactory programme of quality assurance is the establishment of a mechanism for addressing inadequacies in treatment. The use of continuing education as such a tool is examined and the shortcomings discussed. It is seen that the likelihood of improvement in care is much enhanced when some form of feedback is provided to the clinician under review.

The usual barriers to implementation of quality assurance are discussed. The attitudes of patients, dentists, government and professional associations are not apparently a difficulty in this regard and are seen to be generally positive towards quality assurance programmes. Legal considerations are considered and, while some anxieties still exist in some quarters, it seems that satisfactory resolution of the problem has either been achieved or is approaching that conclusion. Costs are also often an inhibiting factor to quality assurance implementation but it is seen in this treatise that intelligent application of technology and the selection of appropriate audit methods will allow for cost effective implementation.

Following the review of published data on quality assurance and close examination of five significant systems of dental quality assessment, the relevant issues are discussed in detail. In general, it is recommended that systems of quality assurance be introduced in Australia, in both public and private sectors.

(iii)

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1 INTRODUCTION

In Australia, like most countries, the practice of dentistry is free, for the most part, from any on-going review by others of the quality of treatment provided. Unless that quality provokes litigation or a formal complaint, the standard of care delivered by qualified personnel is not assessed. The various government or semi-government bodies who regulate dental practice are concerned, in the main, with establishing and maintaining licensing requirements and investigating breaches of professional behaviour. Providing one has the necessary qualification and is not deemed to be guilty of "unprofessional behaviour", one can continue to provide treatment at a standard which is not measured and which might well be below that acceptable to responsible and learned members of the profession. The narrow attitude of regulatory bodies has been commented upon by Jago (1984) who pointed out that only one case out of eighty-six heard between 1958 and 1979 by the General Dental Council in the United Kingdom related to the competence of the practitioner concerned; other charges being related to allegations of fraud, drug offences and sundry breaches of professional ethics and discipline.

In the public sector, it is normal for the employing authority to require quantitative reports as a measure of productivity of employed clinicians. Indeed, some reports (Bergman 1966; Bertram 1983) have indicated that, as patient load increases, the amount of time spent per patient decreases with the likelihood that quality of care might suffer. Furthermore, one might question the relevance of one of the standard measures of productivity as reflected in the statistics

collected by the New South Wales Department of Health, viz. "occasions of service". These are of doubtful validity as a productivity measure as each attendance is not specifically related to tasks undertaken. Outside the United States of America, however, it is very rare for there to be any requirement in institutions for the assessment of the quality of dental treatment other than that encouraged by normal supervisory management. There is an inherent assumption that the employment of suitably qualified staff subject to routine professional supervision will produce standards of care which are generally acceptable. This approach shows little sign of change as exemplified in the recent report into dental services in Victoria commissioned by that State Government (Wright, Huon, McCutcheon & O'Brien 1986). This otherwise comprehensive report provided a very well researched analysis of dental service needs for that State yet did not address the matter of quality of care at any stage. A similar lack of focus on quality of care is evident throughout other public health systems in Australia. The South Australian Dental Service is often touted as a model dental health programme. It has an evaluation unit which collects a great deal of management information but lacks a comprehensive programme of quality assurance - the latter not even rating a mention in its published objectives (South Australian Dental Service 1987).

Such complacency deserves to be questioned and while sound training, strict licensing requirements and an environment of professional ethics and responsibility go a long way towards assuring good care, it would be very foolish, indeed, for anyone to imagine that this should suffice. Barish and Collins (1974) have alluded to early

studies showing deficiencies in general medical practice and make the point that it is reasonable to assume that similar shortcomings might be found in dental practice. In the USA, Bellin and Kavalier (1970) have estimated that 5 to 10% of Medicare claims would involve poor quality dental care or alleged fraud.

Thus it behoves the dental profession to develop and maintain programmes for the ongoing assessment of the quality of dental care. The lead has been established in medicine where quality assurance is an accepted and essential requirement in hospitals. Furthermore, the dental profession in the U.S.A. has during the past two decades or so carried out significant research into the methods of evaluating the standard of dental care. In that country, this methodology has been applied in the investigation of insurance claims and patient complaints and as a technique in the accreditation of practices for enrolment in third party financing schemes. There has been, unfortunately, much slower progress in the application of these techniques to routine assessment of dental care both in the public sector and in private practice.

This treatise seeks to explore the development of quality assurance techniques and their application in dental practice. Established methods used in medicine will be examined and the constraints imposed by costs, legal considerations and the attitudes of patients, dentists and organisations will be discussed. Examples of five significant systems developed for dentistry in the U.S.A. will be reviewed in detail. Finally, following discussion of the issues involved, a number of recommendations will be formulated.

2 DEVELOPMENT OF QUALITY ASSURANCE IN HEALTH CARE

2.1 DEFINITIONS

There is no intention to provide a comprehensive discrete listing of all terms used in the discussion of this subject. Rather, it is intended that such will be explained within the context of the treatise. However, it is important to start by explaining several key words around which the discussion is constructed.

2.1.1 Quality

In the practice of dentistry any attempt to define the standards of quality will depend to a very large extent on the subjective judgements of others. Indeed, Somers is reported as stating that the word quality itself is a "verbal Rorschach blot" into which people project a variety of interpretations and fantasies (Bailit, Koslowsky, Grasso, Holzman, Levine, Valluzzo & Atwood 1974). Abramowitz and Mecklenberg (1972) in discussing the issues of quality of treatment in the Indian Health Service in the USA have defined quality as "a degree of conformance to a standard". They point out that the word usually is assumed to denote inherent goodness but acknowledge that if one describes "good quality", there is an implication that quality might also be "not good" in certain circumstances. Kress (1980) in a review of literature relating to the evaluation of the appropriateness of care illustrates that quality clearly means different things to different people.

One of the best definitions suggested (Morris, Kephart, Bailit & Vito 1982) is paraphrased from one developed by Lee and Jones:

"Quality dental practice is the kind of dentistry practiced by recognized leaders of the dental profession at a given time period of social, cultural and professional developments."

This definition utilises the standards set by those dentists who have themselves been judged by their peers as providing good quality care for their patients and it is probably the most practical definition available.

2.1.2 Peer Review

A number of different terms have been used for some time to refer to the evaluation of dental care. "Peer review" became the early generic term for such activities because it described the techniques in common usage for assessment of the quality of treatment. According to the AMA/ACHS Peer Review Resource Centre, it means in the narrowest sense "evaluation of the quality of patient care by persons equivalent in status to those providing the care" (Anonymous 1984a). A similar definition was provided by Holland in 1982, and the Australian Dental Association in a 1980 Policy statement proceeded along the same path with "the dental profession" being used in their definition as the reviewing instrument. The National Dental Quality Assurance Advisory Committee of the American Dental Association defines peer review as "formal assessment by dental professionals of the quality of dental services performed". In addition it describes peer review as "professionally sponsored and operated". In the Association's Peer Review Manual it is defined as "a mechanism by which the dental profession demonstrates the appropriateness and

quality of care it renders" (DiAngelis & Speidel 1985). An example of a similar approach is seen in the Peer Review Manual of The Dental Society of New York, issued in April 1979, which relates to peer review only in its narrowest sense of addressing complaints relating to treatment.

As will be described later in this treatise, the review of patient care should not be restricted only to that undertaken by peer groups and, with the passage of time, this term has come to embrace a much more general meaning. Unfortunately, it has been associated largely in the past with investigative reviews of treatment by peer groups involved with the various professional associations and government regulatory bodies and is seen as a threatening term by many. Indeed, Anderson (1983) asserts that this negative image has inhibited progression in the review of the quality of care, and, in the Australian hospital system, it has fallen generally from favour.

2.1.3 Clinical Review

The term "clinical review" has replaced "peer review" in New South Wales hospitals in recent years and is defined by the AMA/ACHS Peer Review Resource Centre (Anonymous 1984a) as "a formal process whereby the quality and appropriateness of patient care is evaluated". The adoption of this term signifies the broadening of the review process beyond the confines of narrow "peer review" and focuses attention away from connotations of punitive judgement to the ongoing review of health care.

2.1.4 Quality Assurance

The AMA/ACHS Peer Review Resource Centre defines quality assurance as "the process of describing and assessing quality of health care as part of an attempt to guarantee optimum standards". The American Dental Association (1983d) emphasises the importance of doing more than merely assessing quality and it defines quality assurance (Stern, Morrissey, Mauldin 1979a) as:

"the assessment or measurement of the quality of care and the implementation of any necessary changes to either maintain or improve the quality of care rendered".

In similar vein, Bailit (1980a) has emphasised this distinction between quality assessment and quality assurance. In his words, the former is "the measurement of quality". He contrasts this with quality assurance which he describes as:

"the completed process of quality assessment, followed by development of a plan to correct any quality deficiencies, implementation of the plan, and then re-assessment to determine if improvements in quality have occurred".

The aforementioned definition adopted by the American Dental Association is accepted for the purposes of this treatise.

2.1.5 Other Terms

Phrases such as clinical audit, medical audit, criteria audit and utilisation review are sometimes used generically to describe the evaluation of the quality of patient care. Some of these terms relate to particular techniques of quality assurance and will be described elsewhere in this treatise. In the "Guidelines for the Development of a Quality Assurance Audit System for Hospital Dental Programs"

published by the American Dental Association (1983d), a glossary of common quality assurance terminology is provided, and is included as an Appendix to this treatise.

2.2 HISTORY

The evolution of quality assurance, while beginning in the latter half of the last century, has largely been a phenomenon of the last thirty years and has been confined for much of this period to the United States of America. It has been very much bound up with the accreditation of hospitals and the introduction of government and third-party funding for health care. In this section, it is intended to examine the history of the evaluation of the quality of health care in medicine and to trace its flow-on to dentistry.

2.2.1 Medicine

Professional pride has always encouraged the search for excellence in achievement, and will continue to do so. Nevertheless, it has long been recognised that major structural inputs into the provision of care are necessary to ensure that treatment of a high quality is provided, although these efforts, arising in the latter part of the last century, have depended initially on the establishment of formalised training and licensure. It was not until the last twenty or thirty years that progression to the establishment of comprehensive quality assurance programmes occurred.

Gotowka and Bailit (1981) report that, as early as the 1860s, Florence Nightingale recommended the introduction of a uniform system of recording and reporting hospital statistics as a means of analysing the effectiveness of treatment. Indeed, her devastating exposure of Crimean War hospitals as death traps was based on

findings that a key determinant of regimental mortality was in fact access to hospital - the incidence of nosocomial infection being the killer rather than the wounds received in battle (Maxwell 1984). In the aforementioned report by Gotowka and Bailit, it is noted that an early 20th century British surgeon, E.W. Groves, urged his profession to maintain statistics on the outcomes following surgical operations.

Progression from these early beginnings has taken place mainly in the USA. Cabot (1912) identified a substantial number of missed diagnoses during a study of 3000 autopsies, and a colleague of his at Massachusetts General Hospital, E.A. Codman developed a system for collecting and tabulating data on surgical outcomes (Codman 1914). Codman's system made an important contribution to the use of medical auditing as a method of assessing patient care, but, over the next four decades, there was little progress in evaluating treatment outcomes as the medical profession came to concentrate more on the structural components of care in terms of the provision of resources such as hospital facilities and personnel. The standard of hospital facilities was found to be very low in a survey conducted by the American College of Surgeons in 1916 and, in the following year, this body developed a hospital standardisation programme and took positive steps to review and upgrade the qualifications of its members (Lembcke 1967). In 1944, the American Public Health Association officially adopted a policy statement on the quality of care, saying "that the services provided be of the highest standard and that they be rendered under conditions satisfactory both to the public and the professions". In 1951, the Joint Commission on Accreditation of

Hospitals was established and took over from the American College of Surgeons the role of monitoring hospital standards. Although a voluntary accrediting body, the JCAH became very influential in the improvement of hospital-based care (Punch 1980). Another development of some significance occurred in 1954 with the establishment of the Medical Care Foundation in California. Founded to ensure high quality care at reasonable cost, it was a non-profit private organisation composed of medical practitioners who were concerned with assessing the appropriateness of care prior to authorising payment by fiscal intermediaries. The United States Congress accepted the MCF model as a means of monitoring costs and the quality of health care and this formed the basis of its later PSRO legislation (Bailit 1980a). A further milestone occurred in 1956, when Lembcke effected a significant advance in the development of reviewing health care with the introduction of his system of medical record audit. He introduced the concept of the use of pre-determined criteria and standards in the audit process and this system was further refined by Payne in 1967 when he stressed the need for development of normative criteria, as determined by experts, as measures of performance. The 1965 Medicare legislation in the USA provided a further spur to the growth of quality assurance activities and encouraged the use of utilisation reviews as a means of determining the justification for particular treatments or lengths of stay in participating hospitals. In 1972, Professional Standards Review Organizations were established as a result of Social Security legislation to monitor efficiencies in health expenditure, the maintenance of professional standards and the avoidance of unnecessary treatment. PSROs carried out more stringent utilisation reviews than those originally set up under the Medicare

legislation and conducted a number of evaluatory studies of medical care. The PSROs were later supplanted by PROs (Professional Review Organizations) which, despite having more explicit quality-of-care objectives than their predecessors, were seen to be more concerned with cost-containment rather than serving as agencies for improving the quality of care (Dans, Weiner & Otter 1985). A further development in the USA took place with the Social Security Amendments legislation of 1983 which changed the basis for funding under Medicare. Formerly, hospitals had been reimbursed on the basis of reasonable inpatient costs - providing no incentive for reduction of admissions, length of stay or the use of ancillary services. The new arrangements provided funding on the basis of a fixed, pre-established fee per discharged patient based on the patient's assignment to a diagnosis-related group (DRG). This method encouraged hospitals to shorten stay and avoid unnecessary services, although not removing the incentive to increase admissions. Grimaldi and Micheletti (1984) believe that the introduction of the DRG-funding has led to more emphasis being placed on quality assurance activities in hospitals.

Moves towards the establishment of organised review of the quality of medical care began in Australia only relatively recently. The concept of non-government voluntary accreditation of hospitals began in Australia with the establishment of the Australian Council on Hospital Standards in 1973. The impetus for its formation arose from the New South Wales Branch of the Australian Medical Association and the Victorian Branch of the Australian Hospital Association, with subsequent financial assistance from the Federal Government in 1973

and, after 1974, with grants from the W.K. Kellogg Foundation (Brand 1981). At this time there was little evidence of formal ongoing quality assurance activities as evidenced in a 1974/ 75 survey of 92 Australian short stay acute hospitals (Scarf, Weaver, Duckett & Schmied 1979). In 1976, the then Federal Minister for Health, the Hon. R.J.D. Hunt (Australia 1976) noted that "doctors play a key role in determining overall costs" and called on the medical profession "to institute systems of professional standards review, designed both to assess the quality of, and to seek justification for, services rendered". He stated that "failure to have workable systems in operation within three years could result in the introduction of mandatory systems". Subsequently, the Federal Government entered jointly with the Australian Medical Association and the Australian Council on Hospital Standards into the establishment of the AMA/ACHS Peer Review Resource Centre. The Federal Government provides substantial funding for this body through a health services research and development grant. The AMA/ACHS Peer Review Resource Centre publishes a quarterly journal, "Australian Clinical Review", the first issue being produced in May 1981.

The various States have been very slow in taking up this Federal Government initiative. In fact, as pointed out by Wilson (1987) it has taken another ten years for the N.S.W. Government to make any reference to quality assurance in health policies and the other State Governments have had little or nothing to say on the subject. Fortunately, in the interim, the Federal Government/AMA initiative has had some significant effect on individual providers of care and their organisations. As a result, clinical review programmes are in

place in numerous hospitals and the concept of quality assurance is no longer foreign in institutional medicine (Castaldi 1981; Collopy 1981).

In the United Kingdom, as described by Maxwell (1984), quality assurance activities have revolved around the following aspects.

1. Educational accreditation for training purposes such as the standards of the various Royal Colleges, nursing institutions and other such bodies. Maxwell describes these standards as "shadowy".
2. The confidential enquiry into maternal deaths. This review traces reports from the 1930s on from local obstetricians which are assessed and form the basis of a public report. There is doubtful evidence that this report has had any significant effect in acting as an educational tool to improve health outcomes.
3. A review of clinical chemistry, beginning in 1969. This functions as a national quality control mechanism whereby, every two weeks, a portion of submitted material is forwarded to all participating laboratories and the results returned for comparison. This has shown progressive improvement in reducing test result variance and similar schemes are now in operation in haematology and bacteriology.
4. The Health Advisory Service and the National Development Team. Set up in 1969, multidisciplinary teams visit major long-stay

institutions, review and discuss their findings on health outcomes and report to the relevant district health authority and the Secretary of State for Health.

5. Peer review in general practice. In 1980, the Royal College of General Practitioners set out to develop a framework for defining and auditing standards of care. Criteria were developed and practitioners participated on a voluntary basis.
6. Cluster analysis of performance indicators eg. length of stay.
7. The Royal College of Physicians. This body set up a medical services study group in 1977 which, to date, has carried out over twenty investigations of the efficiency and outcome of selected aspects of medical practice.

In response to growing professional and public interest in the quality of health care in Britain, the Kings Fund Centre established in late 1984 a national project to promote quality assurance in health services in the United Kingdom. The initial emphasis of the project has been placed on acute care hospital services. The objectives of the project are to:

1. ascertain current quality assurance activity in Britain;
2. collate and disseminate information to assist in the development of quality assurance programmes;

3. identify needs in training and research and development, and initiate activity to fulfill these needs; and
4. encourage quality assurance nationally among individuals as well as statutory, voluntary and private organisations (Shaw 1986).

Canada and the Netherlands, like the USA and Australia, have a system of accreditation of hospitals and reports by Paine (1986), Carver (1986) and Shanahan and Timmons (1986) indicate that other countries are showing signs of interest in establishing quality assurance programmes - notably China, Columbia, Indonesia, Korea, Poland and Spain. Du Verlie (1986) has traced the history of quality assurance activities in France and reports that retrospective audits of care provided in hospitals were first undertaken in the mid 1970s. In 1978, the French Minister for Health created a special Medical Consultation Commission to explore how best to undertake a qualitative evaluation of medical care in hospitals. In 1984, the Italian Quality Assurance Society was founded and the "European Newsletter on Quality Assurance" was published for the first time by the National Association for Quality Assurance in Hospitals in the Netherlands. Quality assurance bodies have also been formed in recent years in Sweden and Hungary. In 1984, the European member states of the World Health Organisation resolved that all their health care systems should have effective quality assurance mechanisms by 1990. In other countries, such as Israel, quality assurance activities are generally confined to those associated with health insurance (Matoth 1981).

2.2.2 Dentistry

Unlike developments in general health care, the issue of quality assurance in dentistry has been almost entirely confined to programmes in the United States of America. Most of the research in quality assurance in medicine has been centred around hospital practice whereas in both U.S.A. and Australia, most dentists are solo practitioners (Stern 1979; Barnard 1987). DiAngelis (1984) lists five factors which have contributed significantly to the growth of dental quality assurance in the USA, namely:

1. the rapid proliferation of dental prepayment mechanisms and the attendant concerns of group purchasers with cost and quality;
2. the tremendous growth in the portion of gross national product devoted to health care;
3. the implementation of PSRO legislation in 1972 which was designed to monitor cost, quality and appropriateness of care for patients whose hospital care was federally funded (the implications of PSRO legislation for dentists with respect to their treatment of Medicare and Medicaid patients being subject to review has been outlined (American Dental Association 1972));
4. the expansion of the role of consumers and their interest in the health care process; and
5. the increase in litigation in addressing the failure of the

professions to effectively monitor the performance of their providers. (In this respect, Gilbert (1984) has shown that courts in the USA are increasingly requiring hospitals to monitor, at least retrospectively, the competence of staff and the quality of care rendered.)

Ongoing reviews of dental care are a relatively recent phenomenon, arising mainly during the past decade or so. Prior to this period, most efforts had been directed to qualifications and licensure. Klyop (1985) reports that, as early as the 1700s, the dental profession was pressing for state licensure of dentists. Such regulation had commenced in medicine with New York in 1760, dentistry prior to 1840 being a subspecialty of the medical discipline. Kentucky became the first state to establish a Board of Dental Examiners in 1867 and by the end of that century, most other states had followed suit (Bailit 1980a).

Another important impetus to the progression of dental quality assurance was the organisation by several state dental societies in the 1950s of non-profit dental insurance carriers, or dental service corporations. This led to the introduction of pre-treatment reviews - the forerunner of the dental quality assurance systems of today (Bailit 1980a). One of the largest such insurance systems was that created by the dental profession in 1955, the California Dental Service which within 20 years had covered 20% of the state population and included 96% of the full time dentists in the state in its membership. The Service developed a unique system of professional review using resident dental staff, regional consultants and the Peer

Review Committee of the California Dental Association (Bernhardt 1974). The involvement of funding bodies in quality assurance was illustrated in a study conducted by the Research Triangle Institute, North Carolina, on behalf of the U.S. Department of Health Education and Welfare (Nash, Garfinkel & Bryan 1975 a & b). Nine third party carriers of prepaid dental insurance were studied and in addition to pre-treatment reviews, other programmes utilised by these bodies included professional reviews of claims, peer review mechanisms and utilisation reviews.

The American Dental Association began the accreditation of hospital dental programmes in 1946 thus providing a sound background for the establishment of standards for dental care. By 1964, the hospitals of the U.S. Public Health Service had begun a system of dental quality of care audits (Hine and Bishop 1979) and in 1967, the American Dental Association approved a directive to state dental societies to establish Dental Society Review Committees, and the Council on Dental Care Programs urged "those dental societies without review committees to establish them promptly rather than await demonstrations of critical need, serious prepayment problems, or legislative mandate" (Barish & Collins 1974). While these committees were intended primarily to deal with problems between the patient, the provider and the insurance carrier, the American Dental Association shortly afterwards expanded their role to include quality assessment. In addition to its statement in its principles of ethics (Anonymous, 1973) which established the primary duty of every dentist to give "the highest type of service of which he is capable", the American Dental Association has indicated by its active involvement the

importance it places on visible and active quality assurance programmes.

In 1972, personnel of the US Indian Health Service accepted the challenge to develop a satisfactory system for evaluating the quality of dental care with the development of a programme based on definition of what were seen to be minimum acceptable care standards. (Abramowitz and Mecklenberg 1972).

In 1975, the Council on Dental Care Programs of the American Dental Association developed a Peer Review Procedure Manual and in 1976 initiated a study which sought to identify existing quality assurance activities. (Klyop 1985). In the final report of this study, it recommended:

1. quality assessment components of the record should be identified;
2. the relationship between quality assurance and continuing education needs to be explored;
3. guidelines to ensure confidentiality of quality assurance reports need to be developed;
4. criteria, particularly for the necessity and appropriateness of care, should be developed;
5. review systems to assess all types of dental care practitioners should be explored; and

6. an ongoing system to review the components of a quality assurance programme should be developed to ensure that the methods and procedures used are effective in achieving the programme's goals.

Perhaps the most significant development about this time was the initiation of the National Dental Quality Assurance Program, administered by the American Fund for Dental Health and supported by a \$2.5 million commitment from the W.K. Kellogg Foundation. The programme was begun in December 1976 with completion accomplished for all but two of the thirteen projects within five years (Klyop 1985). A list of the organisations and investigators and the titles of the thirteen studies are shown in Appendix 2.

Other projects funded under this national programme were the development of a glossary of quality assurance terms and the conduct of a workshop on dental quality assurance. The latter was held at Ann Arbor, Michigan, on October 18 and 19, 1985, and was sponsored by The University of Michigan, School of Dentistry and Delta Dental Fund. The topics presented at this seminar are listed in Appendix 3.

In 1977, the American Dental Association formally supported the concept of combining grievance matters and problems among insurance carriers under its Peer Review Committee and encouraged local state dental societies to set up their own Peer Review Committees. The next year, it produced a report, "Quality Assurance in Dentistry" which provided a state-of-the-art analysis of quality assurance activities and recommendations for research and related programmes

(Stern, Morrissey & Mauldin 1979a,b&c). This report did much to change the attitude of the profession and encourage involvement in investigations into the quality of care (Hillsman, Albertini & Crawford 1985). Following on from its early accreditation of hospital dental programmes, the American Dental Association in 1980 became a participating organisation of the Joint Commission on Accreditation of Hospitals. Certain aspects of hospital dental services came under the jurisdiction of PSRO (and later PRO) legislation - in particular, inpatient oral surgery procedures and some dental outpatient services.

In 1982, the American Dental Association established an Office of Quality Assurance, with the following objectives:

1. to centralise and coordinate the various quality assurance activities for the ADA;
2. to maintain liaison with other national organisations and provide information on quality assurance research and development;
3. to provide the profession's perspective on quality assurance activities to the federal government and other agencies; and
4. to operate an informational clearing house on quality assurance and disseminate reports in this area.

The establishment of this office became an overt indication of the importance placed on the quality of dental care by the profession

itself and was further exemplified by a resolution of the American Academy of Group Practice requiring its members to demonstrate the existence of a quality evaluation programme (Burakoff & Demby 1985).

In April 1983, a National Round Table on Dental Quality Assurance was held in Chicago at which the thirteen studies carried out under the national programme were presented and discussed. The Office of Quality Assurance of the American Dental Association cooperated with the American Fund for Dental Health in publishing the proceedings of this conference.

In addition to the influence of the medical profession (Morrissey 1977) as a factor in development of systems of review of the quality of dental care, we can see, then, that the aforementioned changes in US legislation, the involvement of third-party financing bodies and the leadership shown by the dental profession itself have led to the establishment of dental quality assurance in that country. More importantly, the early initiative shown within the profession has enabled it to assume the guiding role thus obviating the need for government intervention. Demby (1985) points out that the increasing supply of dentists and the emerging consensus among governments, employers and consumers regarding the need to control costs of health care suggest that public pressures and the threat of administrative interventions provide a strong inducement for the profession itself to initiate systems of review. Markus (1981) has echoed, from the viewpoint of the British physician, many of the concerns expressed in the USA relating to the "dangers" of government involvement. He sees this involvement as the forerunner for increasing interference

in clinical affairs, although he acknowledges the public's entitlement to confidence in the maintenance of adequate standards of health care. He stresses the need for the involvement of the professions in the first instance to prevent the need for intimate government involvement.

Outside the USA, the quality of dental care has been centred predominantly around the establishment of qualification and training and associated licensure requirements. An analysis of reports in the British Dental Journal from 1958 to 1979 of disciplinary charges against dentists in the United Kingdom was used by Jago (1984) to question the claim of the General Dental Council that it protects the public with respect to monitoring the competence of dental practitioners. Only one charge out of eighty-six heard by the GDC in this period related to professional competence, the others being concerned with criminal and ethical breaches. Jago argues in this paper that the GDC, rather than carrying out a role of concern for patients, is more concerned with the professional image of the dentists. Pogrel (1985) has pointed out that in the UK, while dentists employed by the National Health Service can be removed from N.H.S. lists if their performance is unsatisfactory, there are no checks on performance in the private sector. Furthermore, he alleges that there are virtually no controls whatsoever on the clinical performance of consultants in the National Health Service where there are no formal systems of review of quality of care.

Perhaps Jago is a little harsh in his criticism of the British National Health Service for its lack of attention to matters of

quality. The Dental Estimates Board in Great Britain have been collecting statistical data since 1948 comparing dentists' treatment patterns with national and regional figures. Every two years, each dentist's patterns are analysed for two variables - frequency distribution of services provided and ratio of fillings to extractions. The latter has been shown to correlate very well with the quality of care provided (DeJong & Dunning 1970). Only when deviation in treatment patterns of some significance occurs does it lead to evaluation of treatment by a practitioner. DeJong and Dunning postulate that this particular quality assurance approach works well in the U.K. for four reasons:

1. the magnitude of the NHS lends itself to statistical review;
2. most British dentists are participants in the NHS;
3. a standard billing form is universally used throughout the NHS;
and
4. the British government acts as the third party financier in this scheme and is responsible to its taxpayers for the quality of care.

DeJong and Dunning list two disadvantages of this statistical approach, namely:

1. deviations in practice patterns do not per se imply deficiencies in quality of care; and

2. analysis of quality of care by this technique only measures patterns of treatment and not individual services and hence the human element is missing.

The confinement of issues of quality of dental care to those instances associated with patient complaint or litigation is general outside the USA. The Australian Dental Association produced a Policy Statement on "Peer Review" in 1980 but has restricted its deliberations to this narrower definition of the review role. There is no formal accreditation of dental institutions in this country, nor is ongoing review of the quality of care an inherent part of private or public dental practice. Public authorities normally confine their management role to the measurement of productivity as exemplified by the recent report (Wright, Huon, McCutcheon & O'Brien 1986) into Dental Services in Victoria, wherein the subject of review of quality of care was not addressed. The problems arising from restriction of the review of the quality of dental care to those instances associated with alleged malpractice has been well demonstrated by Burakoff and Demby (1985). They claim that this form of peer review is the end-point of failed quality assurance efforts and Table 1 contrasts the effects of this approach with those arising from a system of ongoing quality assurance.

It is apparent, then, that the examples set in the U.S.A. with the development of dental quality assurance have not been followed in other countries. While there have been a few instances of government involvement, dental institutions have shown little interest in the

subject. More importantly, there has been no evidence of dental associations outside the USA undertaking any responsibility for ongoing review of care. This is of particular significance in Australia as most dental treatment is delivered in private practice.

Table 1. Characteristics and differences between
malpractice and quality assurance

Source: Burakoff & Demby (1985)

MALPRACTICE	QUALITY ASSURANCE
Retrospective	May be both retrospective and prospective
Punitive	Preventive
Educational benefit is minimal	Educational intervention
Costly	Reasonable cost
Limited benefit to society	Greater benefit to society
Encourages defensive attitude	Encourages feedback to providers
Impersonal	Behaviour change
Extreme measure: final screen on competence	Ongoing

3 QUALITY ASSURANCE METHODOLOGY

3.1 TOPIC SELECTION

A priority system for defining aspects of patient care research or education or both that might be most rewarding in terms of improvement of care was developed in a joint project conducted by the Rockford Memorial Hospital and the University of Illinois (Williamson, Alexander & Miller 1968). This system consisted of three steps:

1. ranking medical conditions in accordance with expected patient impairment, using disability and social disruption weightings;
2. determining - using literature searches and consultant opinions - which of these conditions encompasses sufficient preventable or remedial impairment to warrant the third step in the system; and
3. assessing the quality of care provided to determine whether further effort might be indicated to effect improvement.

Later, Williamson (1978a) further pursued this concept of topic selection by focusing quality assurance on what he referred to as ABNA, "achievable benefit not achieved". Williamson blamed much of the failure of quality assurance activity to produce documented health care improvement on lack of attention to selecting areas of study where this "achievable benefit" is most likely to be achieved. He describes a structured procedure based on a nominal group

technique (Delbecq & Van de Ven 1971) for establishing topic priorities according to ABNA. He also reviews 14 years of experience with both structured and non-structured topic selection procedures in 23 multispeciality group clinics and their associated hospitals. On the basis of this experience, he endorses this method of establishing priorities for quality of care projects and recommends it for application to most systems. He notes that topics selected by this method seemed to give greater attention to non-disease, paediatric and adolescent problems, prevention, health education and non-medical providers including dentists and administrators.

The priority setting methods espoused by Williamson (1978a) were trialled at Westmead Hospital (Bates, Alexander, Gale, Roberts & Pearson 1984) in a multidisciplinary audit in an acute care setting. Representatives of various medical, paramedical and clerical disciplines working in the Intensive Care Unit were chosen to set priorities for problems within the Unit which most affected the quality of patient care. As Williamson (1978b) found, the areas chosen related more to administrative than clinical issues. The topics chosen, ranked in priority order are set out in Table 2.

Table 2. Westmead Hospital - Intensive Care Unit
- Quality Assurance Topics*

Source: Bates, Alexander, Gale, Roberts & Pearson (1984).

Topics

1. The Unit fails to attract/keep trained ICU nurses in sufficient numbers.
Nursing staff shortages at critical times.
2. Recognition that relatives do not hear messages at times of stress and effective response.
3. Lack of time for R.N. education because of shortage of numbers of nurses and patient load.
Some ICU staff cannot operate some pieces of equipment which may or may not lead to false reports of faulty equipment.
4. Communication within ICU amongst staff because of frequent changes in medical and nursing staff.
5. Recognition of critically ill patients outside ICU and the means to improve recognition leading to earlier consultation with ICU.
6. Who takes responsibility for / who gives information regarding state of patients to relatives?
7. Difficulty getting appropriate beds for transfer out of ICU because of heavy patient load in hospitals, lack of understanding of need by other nurses for necessity to receive patients.
8. Difficult to gain access to certain items of equipment (Biomedical Engineering).
9. Difficulty in sustaining detailed attention to protocols, given high staff turnover.
10. Who determines who visits in the unit?

*Note: The exact phrasing used by staff has been retained to avoid any change of meaning.

The experience confirmed the value of the topic selection exercise and staff members appreciated the minimal amount of time involved (two hours) and expressed willingness to participate in further projects of this nature. It was found in this study that it was important for someone to be nominated as responsible for following up topics chosen and for the staff associated with the problem area to be involved as early as possible.

A similar approach to quality assurance topic selection has been taken in the Westmead Hospital Dental Clinical School. The Williamson approach was further modified with the total time of involvement of the group cut down on each occasion to one and a half hours with elimination of the trial selection meeting. Topic selection meetings were held in November 1985 and November 1986 to select problem areas for review in the following years. Because of the need to approach the topic selection on a school-wide basis, the need to have adequate clinical representation from the various departments and units, and the requirements of group size, the committee consisted entirely of dentists with a nursing representative in the 1985 group. As noted in the Intensive Care Unit experience, topics chosen were more administrative than clinical in nature, although the group was not a multidisciplinary one in the broad sense. Adequate follow up of topics selected was undertaken by delegation of each problem-solving exercise to a small working group from the topic selection committee who were most involved with the problem. Members of clerical, nursing and other disciplines were co-opted into these working parties as appropriate and each group was given a specific target date by which to report progress. The 1986 programme was addressed most

successfully and the list of topics undertaken is illustrated in Table 3.

Table 3. Westmead Dental Clinical School
- 1986 Clinical Review Topics

1. Establishment of criteria for initiation of orthodontic treatment for patients in the mixed dentition stage.
2. The need for improved feedback after referral of patients to specialist departments.
3. Provision of appropriate patient selection for DAU instruction.
4. Correction of inadequate linking of medical and dental records.
5. Education of Dental School staff in the management of patients who are Hepatitis B carriers.
6. Relationalisation of treatment delivered for primary oral care patients.
7. Improvement in the diagnosis of periodontal disease.
8. Improvement in treatment planning with respect to denture design.
9. Importance in desk/surgery communication.
10. Establishment of indications of likely cooperation for orthodontic patients prior to commencement of complex treatment.
11. Improvements in productive scheduling of patient appointments.
12. The need to overcome deficiencies in comprehensive treatment planning and patient management.
13. The elimination of unnecessary waiting time for patients attending the Primary Oral Care Unit.
14. Establishment of an ongoing system of review of completed patients.
15. Analysis of the quality of history taking for new patients.
16. Review of the management of patients presenting after hours with avulsed teeth.
17. A review of the rationale for removal of third molar teeth under general anaesthetic.

3.2 DIMENSIONS OF CARE

Donabedian, in 1968, proposed that the quality of care could be evaluated from essentially three different but related aspects; structure, process and outcome. Burakoff and Demby (1985) have provided useful and concise definitions of these, as follows:

STRUCTURE: The organisation and resources available to support the provision of services.

PROCESS: The events and activities that do or do not occur when the patient and the health care facility interact.

OUTCOME: The end results of health care, which may be health status, or a portion of health status.

While Donabedian's approach continues to provide a sound basis for focus of clinical review, Maxwell (1984) has taken a somewhat different path and describes six dimensions of the quality of care as:

1. access to services;
2. relevance to need (for the whole community);
3. effectiveness (for individual patients);
4. equity (fairness);
5. social acceptability; and
6. efficiency and economy.

With respect to dentistry, Schonfeld (1967, 1969, 1971) considers

that the evaluation process in quality of care review should be applied to four levels of service or care:

1. the restoration or service;
2. the mouth;
3. the person; and
4. the community.

Furthermore, he defines four dimensions of resources:

1. the technical dimension;
2. the professional-logistic dimension;
3. the organisational dimension; and
4. the financial dimension.

He asserts that this approach permits the review process to cover the adequacy of care in both its qualitative and quantitative aspects.

3.2.1 Structure

One of the most obvious examples of an element of "structure" is the qualification required for licensure of the health care provider. Other structural components might include the organisation of the health service and the layout of the facilities and their environment including provision of equipment.

3.2.1.1 Emphasis on structure

To this day, there has been a tendency throughout the world to concentrate on matters relating to "structure" as a means of ensuring

the delivery of good health care. The approach of the dental profession is an excellent example of this attitude where the emphasis is on the attainment and registration of an appropriate qualification as an indication of skill and training. The inherent assumption might well be that satisfactorily qualified personnel, subject only to review on complaint, will perform their professional duties in a satisfactory manner because of their faithful adherence to a code of ethics. While aspects of structure are very important factors for consideration, Leslie H.W. Paine, Editor of "World Hospitals" and the "International Hospital Yearbook" has pointed out (1986) that the reliance on structural standards to guarantee sound health care is unsound. He criticises the assumption that the employment of skilled personnel assures good quality of care and states that "the provision of health care, like the road to hell, is paved with good intentions and even the best hospital practitioner can fall below the best standards for a variety of reasons....". Purity of motive alone is not satisfactory as a performance measure.

3.2.1.2 Credentials

Hospitals endeavour to promote high standards of health care by delineating privileges for appointed medical staff. Jessee (1987) has outlined the various approaches which can be taken to the delineation of privileges. They can be developed with regard to:

1. practitioner speciality;
2. patient risk categories;
3. lists of procedures; or
4. combinations of the above.

Table 4 gives an example of a combined approach to delineating paediatric privileges which gives recognition to the training and experience of the clinician and the procedure undertaken. However, one should not be complacent in relying on the credentials of the health provider as a means of assuring quality of care. Zimble and Wendorf (1984) have outlined the use of the delineation of clinical privileges as a key element in quality assurance program of the United States Naval Regional Medical Center, Orlando, Florida.

Unfortunately as Captain Zimble would be only too aware, such a structural approach has its pitfalls and readers of an article in Time magazine of March 3, 1986, by Jamie Murphy might recall the case of Captain Donal M. Billig, Chief of Cardiothoracic Surgery at Bethesda Naval Hospital in 1983-84. Billig was ultimately charged with five counts of involuntary manslaughter resulting from technical errors and poor judgement. Subsequent to this case, an audit of 22 military medical facilities conducted in 1985 questioned the competence and qualifications of some two-thirds of practising doctors and nurses. Fortunately, the Billig case has led to a number of reforms and a general updating of the system of monitoring quality of care in military hospitals. In the Time article, David Newhall III, the Principal Deputy Assistant Secretary for Defence for Health Affairs, is quoted as saying that military medicine now has a more extensive quality review system than its civilian counterpart.

Table 4. Categorical/procedural delineation of paediatric privileges
(page 1 of 2)

Source: Jessee (1987) p213.

Categories:

Category I Privileges in this category allow the physician to diagnose and treat uncomplicated diseases where there is no apparent serious threat to life.

Criterion:

Physicians with limited training and experience in paediatrics.

Category II Privileges in this category allow the physician to diagnose and treat more complex or severe paediatric diseases.

Criterion:

Physicians with extensive experience and/or training in general paediatrics.

Category III Privileges in this category allow physicians with certain areas of expertise to diagnose and treat diseases in one or more of the following indicated areas:

- _____ Neonatology
- _____ Cardiology
- _____ Endocrinology
- _____ Allergy
- _____ Pulmonary medicine
- _____ Infectious diseases

Criterion:

Physicians with subspecialty training or similar experience in the indicated area.

Table 4 (page 2 of 2)

Procedures:

Procedures requested below may require documentation of training and experience.

I. Neonatal Care Privileges

- ☐ Class A: Normal care of newborn infants weighing more than 2,000 grams.
- ☐ Class B: Normal care of newborn infants weighing less than 2,000 grams.
- ☐ Class C: Care of preterm, low-birth-weight infants with non-life-threatening illnesses.
- ☐ Class D: Care of all newborn infants, including those with potentially life-threatening illnesses.

II. Minor Surgical Procedures

- ☐ Exchange transfusion
- ☐ Peripheral venous cutdowns
- ☐ Umbilical vessel catheterization
- ☐ Intubation
- ☐ Insertion of chest tube for treatment of pneumothorax
- ☐ Other: _____

(Note: General surgical procedures, such as nevi excision, laceration repair and drainage of superficial abscesses, are permitted for all individuals with privileges in procedure group 1 or higher.)

III. Diagnostic Procedures

- ☐ Bladder taps
- ☐ Lumbar punctures
- ☐ Laryngoscopy
- ☐ Peripheral arterial puncture
- ☐ Abdominal paracentesis
- ☐ Thoracentesis
- ☐ Bone marrow aspiration
- ☐ Other: _____

3.2.2 Process

There are many elements in the "process" aspect of care which might be reviewed. One might well audit the various steps in the treatment process such as details of medical history recorded, quality of radiographs, the treatment plan, steps in the operative procedures and the quality of finished restorations. One can review the presence or absence of various procedural steps such as the application of rubber dam or focus the review on the performance of each step with reference to an established standard.

3.2.2.1 Process Audit

When the limitations of dependence on assessment of structure as a means of ensuring good patient care was recognised, the emphasis in quality assurance programmes shifted to an analysis of "process" components. Such aspects lend themselves readily to audit in medicine where diagnosis and treatment are documented comprehensively in the patient's medical record and can be examined retrospectively. In dentistry, such assessment is more difficult. It is relatively easy, using radiographs or clinical examinations to detect restorations with large gingival overhangs but more of a problem to assess the merit of embrasures and contours in the same restorations. How might one assess patient management, for instance? Consequently, and unfortunately, most dental quality assurance systems end up monitoring the treatment areas that are measurable and not necessarily those that are the most important (Bailit 1980b).

3.2.3 Outcome

The third of these aspects for review described by Donabedian - outcome is, after all, the most important as the attainment of optimal health status must be the primary objective of care. Unfortunately, it is not as easy to assess this element as it is to review structure and process and it is less common as the focus in quality assurance programmes.

3.2.3.1 Measurement and evaluation of health outcomes

Di Angelis (1984) has expressed criticism of clinical teaching programmes which, he says, expend considerable time and creative energy in process level assessment of technical excellence, often to the exclusion of addressing the questions of appropriateness of care, timeliness of care, the art of care and the eventual outcomes of care.

A method has been described for measuring the quality of medical care by using the incidence of unnecessary and untimely outcomes of health (Rutstein, Berenberg, Chalmers, Child, Fishman & Perrin 1976). Williamson, in 1971, described a strategy for the evaluation of the quality of patient care using diagnostic and therapeutic outcomes. Related variables in the diagnostic and therapeutic processes were assessed only if the outcomes did not meet established standards. Williamson maintains that this approach, focused as it is on outcomes, has particular value as it:

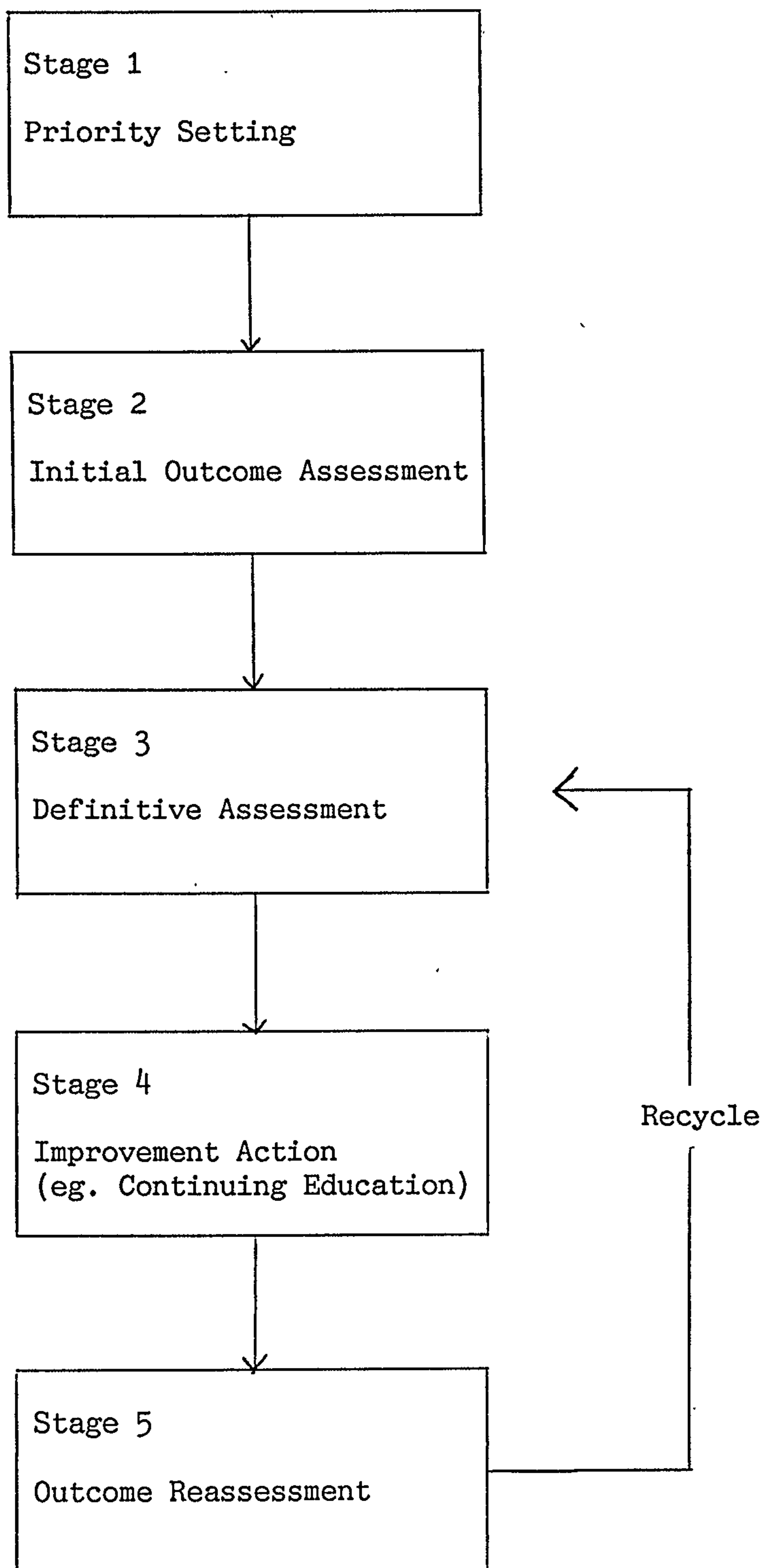
1. requires the providers of care to focus on prognosis;
2. focuses attention on overall patient impairment and stimulates the search for any of the multiple determinants of such impairment which might be important; and
3. enhances educational activities by directing them to the solving of real problems in health care, by identifying learning needs and lending itself to the assessment of educational effectiveness in terms of the total care process.

Williamson has continued his advocacy for emphasis on outcome review and at a hospital affiliated with the Johns Hopkins University in Baltimore, Maryland, has successfully employed what he has termed a health accounting system, based on outcome assessment (Williamson, Aronovitch, Simonson, Ramirez & Kelly 1975). Figure 1 illustrates the stages in this health accounting project in its strategy to assure an improved outcome.

In a recent report, the part that can be played by claims data maintained by health insurance organisations has been demonstrated (Wennberg, Roos, Sola, Schori & Jaffe 1987). The incidence of mortality and complications following prostatic surgery is used as an example of how this data can test hypotheses relating to the outcome of care. This study based on claims data from the Maine Medicare and Manitoba Health Services Commission files illustrates the advantages of this method in terms of cost, ease of follow-up and absence of reporting bias.

Figure 1. Stages of the Health Accounting Project

Source: Williamson, Aronovitch, Simonson, Ramirez & Kelly (1975).



An interesting analogue of the "quality-adjusted life-years" approach used in medicine was developed by Antczak and Weinstein (1987) at the Harvard School of Dental Medicine and used as a measure of dental health outcome. They termed this factor "QATYs" or "quality-adjusted tooth-years" and it resulted from the consideration of the following four factors:

1. the relative value of teeth with sensitivity compared with teeth without sensitivity;
2. the relative value of teeth with good aesthetics compared with teeth with poor aesthetics;
3. the relative value of anterior and posterior teeth; and
4. a discount rate for future tooth years.

In order to provide an outcome measure of a population's experience with a dental care programme, the transitions which occur between the various states of dental care - episodic, initial, maintenance, non-use - were studied (Freed, Marcus & Forsythe 1979). An analysis of the findings showed that this method could be used to allow comparisons of outcome in various clinics, with the degree of success in bringing the population to the maintenance state and keeping it there being the goal. It would also then be possible to use this Markovian model to evaluate changes made to the policies and procedures of the health care facility in terms of the effect on dental health outcome.

While the use of outcomes as a measure of health care is most appropriate, it must be recognised that there are limitations with this approach. In medicine, for instance, the inability of the discharge summary in a medical record to supply an appropriate outcome measurement and the cost of determining outcome measures at a later stage have been recognised as problems. In an outcome evaluation carried out by Lyons and Payne (1974), the medical record was found to be either inadequate or unavailable for follow-up for expected outcomes in a large number of cases. Similar problems have been reported in dentistry. Bailit (1980a) cites three factors which pose considerable difficulties in establishing valid and effective outcome measures.

1. multiple factors affect oral health;
2. the effectiveness of certain services is not always established
eg. the controversy surrounding the various treatment modalities for TMJ dysfunction; and
3. there is a difficulty in establishing the appropriate point in time at which outcome is to be measured.

Stern, Morrissey and Mauldin (1979c) have expressed similar reservations about the problems of establishing useful outcome measures. Di Angelis (1984) lists a further concern as the need to develop satisfactory oral health status indicators, given the limitations of the traditional epidemiological indices which were designed primarily for the assessment of specific pathology. It is

for this reason that Marcus and others sought to develop an Oral Health Status Index. The latter is described in detail in Chapter 8.3.

Kaplan and Greenfield (1978) list a number of circumstances in which process audit might be the methodology of choice over outcome evaluations, namely:

1. when adverse outcomes occur infrequently;
2. when outcomes are determined to a large degree by factors beyond the scope of medical care;
3. when patients have complex multisystem diseases with multiple outcomes;
4. when a convenient time for measuring outcome is inappropriate for the disease; and
5. when the number of cases available is insufficient to draw conclusions about outcomes, but the same cases could be included in a study of the process of care for a broader population.

Much discussion has centred around the inferences which can be drawn from process audit and the relationship between these assessments and the outcome of treatment. Bailit (1980b) has questioned the relationship between improved quality in process and health outcomes eg. the long term effect of biannual prophylaxes and periodontal bone

loss. In an article by Nobrega, Morrow, Smoldt and Offord (1977) the relationship between process and outcome of care has been questioned. On the other hand, Brook (1977) has disagreed with the report of the Nobrega group and was critical of the sample size used for their study. He points out that there is evidence that the use of simple process criteria for quality assessment can indeed lead to improvements in the quality of care. In a study conducted to develop a strategy for relating outcome and process standards, Milgrom (1975) examined 149 malpractice cases relating to dentistry. A list of process categories deficiencies which resulted in adverse outcomes is shown in Table 5. The application of this approach to dental treatment outcomes is shown in the example of "pulpal necrosis", Table 6.

Table 5 Process categories for avoidable adverse events

Source: Milgrom (1975) p1285

Avoidable adverse outcomes from errors in diagnosis

Avoidable outcomes from errors in history

Failure to take history

Medical-social history

Dental history

Error in history

Inadequate or too infrequent

Inappropriate questions or hard to understand language

Failure to keep records

Avoidable outcomes from errors in examination

Inadequate examination

Too infrequent examination

Avoidable outcomes from errors in radiography

Poor-quality films

Poor interpretation

Inappropriate use

Failure to take radiographs

Failure to protect patient

Avoidable outcomes from errors in diagnosis

Inadequate diagnosis

Inadequate technical treatment plan

Failure to refer patient

Avoidable adverse outcomes from errors in treatment

Avoidable outcomes from lack of skill

Poorly treated fractures and surgical cases

Poorly designed restoration or prosthesis

Poorly designed orthodontic appliance

Errors involving general anesthetic

Cosmetic failures

Poor treatment sequencing

Avoidable outcomes from failure to take preventive steps

Secondary injury in treatment

Accidents

Errors in judgment

Failure to protect patient

Avoidable adverse general medical outcomes

Avoidable adverse outcomes from errors in follow-up

Avoidable outcomes from failure to follow up

Avoidable outcomes from improper or inadequate follow-up

Avoidable adverse outcomes from societally prescribed actions

Avoidable outcomes from gross negligence

Avoidable outcomes from abandonment

Avoidable outcomes from lack of informed consent

Table 6 Avoidable adverse events involved with pulpal
necrosis and degree of avoidability.

Source: Milgrom (1975) p1285

Process and examples	Degree of avoidability
Adverse outcomes from errors in diagnosis	
Root resorption and pulpal necrosis of permanent tooth resulting from failure to properly diagnose an impacted tooth.	High
Pulpal necrosis resulting from delay in treating a deep caries lesion because of poor-quality radiographs or inadequate interpretation.	High
Adverse outcomes from errors in treatment	
Pulpal exposure resulting from lack of skill in restorative preparations	Moderate
Devitalization of an adjacent, noninvolved tooth during apical curettage.	High
Adverse general medical outcomes	
Pain and suffering resulting from an undiagnosed, untreated nonreversible pulpitis.	High
Internal resorption from iatrogenic causes	High
Adverse outcomes from errors in follow-up	
Pulpal necrosis resulting from failure to follow up on caries occurring under orthodontic appliances.	High
Damage to an adjacent tooth with no steps to maintain.	High
Adverse outcomes from legally proscribed acts	
Pulpal necrosis resulting from an iatrogenic pulpal exposure with failure to inform patient of causation and possible sequelae.	High

The Sunset Park Quality Assurance system developed at the Lutheran Medical Center in New York by Demby and Rosenthal (1978) was used as the basis of a study reported in the National Quality Assurance Studies which sought to examine the process of care through treatment and utilisation profiles and patient records and compare it with defined outcomes established by clinical evaluation and patient satisfaction surveys.

In a study reported by Hine and Bishop (1979) it was emphasised that quality assurance in dentistry must recognise firstly that many technical procedures may well fall below the academic ideal but have no impact on health outcomes, while, on the other hand, other steps in the treatment process may be technically excellent but have questionable sequelae in terms of the resulting oral health of the patient.

In a study of the quality of dental services received by 6,000 employees of the Blue Cross and Blue Shield Plan of Greater New York, Bailit and Raskin reported in 1978 that the results indicated a reasonable technical standard for amalgams, composites and inlays but a poorer result for crown and bridgework. Perhaps, more importantly, this study raised questions about the relationship between the technical standards exemplified and the oral health outcomes. A multiple regression analysis showed that quality scores accounted for only a minor part of the variations in caries and periodontal disease. Most of the variance was explained by oral hygiene standards.

3.3 SCREENING

It is quite legitimate, therefore, to question the relationships between Donabedian's three foci of review - structure, process and outcome. Furthermore, one might question the justification for developing sophisticated and costly process audit systems as a means of assuring good care. Bailit and Raskin (1978) suggest that perhaps all that is needed is some form of screening to identify those providers whose services fall consistently below acceptable levels and target valuable resources towards detailed follow-up in these cases only.

In July 1969, the U.S. Institute of Medicine (then called the Board on Medicine) of the National Academy of Sciences developed a quality assurance methodology using tracers to measure the process and outcome of care (Kessner, Kalk & Singer 1973). Tracers were selected and combined according to the following criteria.

1. A tracer should have a definite functional impact.
2. A tracer should be relatively well defined and easy to diagnose.
3. Prevalence rates should be high enough to permit the collection of adequate data from a limited population sample.
4. The natural history of the condition should vary with utilisation and effectiveness of medical care.
5. The techniques of medical management of the condition should be well defined for at least one of the following processes: prevention, diagnosis, treatment or rehabilitation.
6. The effects of nonmedical factors on the tracer should be understood.

Tracers used in this study included middle ear infection and hearing loss, visual disorders, iron-deficiency anaemia, urinary tract infection, essential hypertension and cancer of the cervix, and enabled the evaluation of ambulatory care received by a cross section of the population.

In a similar approach, using pregnancy as a tracer condition, a retrospective analysis of prenatal and postnatal outcome was able to show that continuity of care was associated with better patient outcome and satisfaction (Shear, Gipe, Mattheis & Levy 1983).

In 1976, Craddick devised and implemented the California Medical Insurance Feasibility Study. This study was sponsored jointly by the California Medical Association and the California Hospital Association (Craddick 1979,1987). From this study, Craddick developed a set of screening criteria which could be used review medical records and provide early identification of hospital-incurred "adverse events" and patterns of substandard care. The method was called the Medical Management Analysis System (MMA). Criteria were able to be developed by each hospital from the following broad headings:

1. admission for adverse results of outpatient management (at same hospital);
2. readmission for complications or incomplete management of problems on previous hospitalisation;
3. failure to obtain patient consent within hospital policy;
4. unplanned removal, injury or repair of organ or structure during surgery invasive procedure or vaginal delivery;

5. unplanned return to operating room or delivery room on this admission;
6. surgical and other invasive procedures that do not meet criteria for necessity and appropriateness;
7. transfusion reactions, complications and/or improper utilisation;
8. nosocomial infection (hospital acquired);
9. antibiotic/drug utilisation that is unjustified, excessive, results in patient injury or is otherwise at variance with medical staff criteria;
10. cardiac or respiratory arrest/low Apgar score;
11. transfer from general to special care unit (complication or utilisation problem);
12. other patient complications;
13. hospital-incurred patient incident (eg. falls, accidents, I.V. errors, medication errors, skin problems, equipment failures, procedural burns, suicide in hospital, loss/damage of property and other similar significant events as specified);
14. abnormal laboratory, x-ray or other test results not addressed by patient's specialist;
15. development of neurological deficit not present on admission;
16. transfer to another acute care facility;
17. subsequent visit to A&E or Outpatients for complication or adverse results related to this hospitalisation;
18. utilisation variations according to medical staff criteria (LOS, resource utilisation or other);
19. medical record review by medical staff;
20. medical record review by nursing staff;

- 21.. departmental or other problem(s) eg. admitting, laboratory,
x-ray etc.; and
22. patient family dissatisfaction.

This type of problem focused approach to quality assurance is endorsed by the Australian Council on Hospital Standards and the N.S.W. Department of Health and its successful use in a 770 bed teaching hospital has been reported (Craddick 1979).

A study, conducted as part of the Kellogg-funded National Quality Assurance Program (American Fund for Dental Health 1983a) looked at methods of determining quality of care from examination of patterns of treatment. This study sought to answer the following questions.

- Are there patterns of care, detectable by computer from ordinary claims data, which can identify "good" or "bad" dentists for preliminary screening purposes?
- Can computer programmes be created to sort and retrieve the type of information necessary from typical accounts data?
- Will it be cost-effective to screen dentists in this manner and to examine a limited number of patients for confirmation of computer-indicated quality of care rendered?

From a sample of 112,000 patients of the California Dental Service treated by 1,531 dentists, the dentists were computer-ranked from presumed "good" to presumed "bad" on the basis of repeated, new, more extensive or radical treatment of a diseased tooth soon after initial treatment which might have originally been expected to have lasted if performed properly. Procedure categories used as tracer components

were as follows.

a. Crowns

Crowns repeated or followed by extraction of the tooth, restoration of the tooth or replacement by a pontic for the same tooth.

b. Restorations 1

Two or three surface amalgam followed by root canal therapy, or extraction, or two or three surface amalgam for the same tooth.

c. Restorations 2

Two or three surface amalgam followed by placement of a crown on the same tooth.

d. Restorations 3

A silicate cement, plastic or composite restoration followed by root canal therapy or extraction of the same tooth.

e. Root canal treatment

Root canal therapy followed by extraction or root canal therapy for the same tooth.

Tracer set I consisted of the following four categories: Crowns, Restorations 1, Restorations 2 and Root Canal Treatment. Tracer set II included Crowns, Restorations 1 and Restorations 3. After each of these tracer sets was used to rank dentists by the sum of repeat ratios, a representative sample of patients was selected for examination conducted according to the "Guidelines" published by the California Dental Association which are described in detail in Chapter 8.1.

The following conclusions were obtained from this study.

1. It is feasible to use computer technology as a first-level screening mechanism for dental quality assurance when patient treatment data is stored in a retrievable manner.
2. Tracers can be formulated which, separately or in combination, will provide various levels of certainty in the prediction of clinical quality of dental services.
3. By use of the computer as a first-level screening device, it is possible to limit clinical evaluation to patients of those dentists for whom there is a high probability of substandard care, thus making the method cost-effective.
4. Tracers and tracer-sets used in this study resulted in a accuracy in prediction of poor care by dentists.
5. The level of accuracy of the tracers is improved with extension of sample size.
6. The California Dental Association guidelines were suitable both for assessment of clinical quality and for verification of computer screening of records.

A second of the studies conducted under the National Program provided possibilities for use as the basis for a screening programme. This project sought to adapt the principles of PACE to dentistry - PACE (Physician Ambulatory Care Evaluation) being a review mechanism conducted by the Utah Professional Review Organization. The PACE programme screens claims data for compliance with clinical guidelines as a basis for identifying targets for further review, for example, pneumonia without follow-up chest x-ray or anticoagulant therapy lacking prothrombin time each month. Using a dental consultant committee, 91 clinical guidelines were established and these were

reviewed for appropriateness and clinical content by specialist societies. Using claims data from the Missouri Dental Service, these guidelines were tested for validity and eliminated or modified as necessary. A list of 43 final guidelines were developed and are shown in Table 7. It was the unanimous opinion of the consultant committee that these guidelines could be used to screen patterns of practice or patient care to enable reviews to be focused on those cases more likely to require further investigation.

Table 7 Final Guidelines - Adaptation of PACE to Dentistry
(page 1 of 3)

Source: American Fund for Dental Health (1983a)

It is recommended that the following guidelines be used to identify patterns of dental practice, rather than isolated instances of exceptional care.

Removable Prosthodontics

1. Review complete upper denture or partial upper denture if replaced or repeated within 5 years of placement.
2. Review complete lower denture or partial lower denture if replaced or repeated within 5 years of placement.
3. Review if patient with a complete denture, office reline, immediate denture, or denture duplication has had no subsequent dental visit for a 3 year period.
4. Review permanent partial denture if followed by three or more restorations within one year of placement.
5. Review permanent partial denture if followed by periodontal surgery, extractions, add on, repair or endodontics within one year of placement.
6. Review partial denture or precision partial if there is no evidence of preventive services within the previous 18 months.
7. Review partial denture or precision partial if there is no evidence of preventive prophylaxis within 18 months following placement.
8. Review upper and/or lower complete denture if placed in patient under age 30.
9. Review overdenture if placed in the same arch where five or more teeth were treated endodontically within the preceeding year.
10. Review adjustment to denture if reported within first six months of complete or partial delivery.
11. Review temporary upper denture if not replaced by permanent upper denture within 18 months.
12. Review temporary lower denture if not replaced by permanent lower denture within 18 months.

Table 7 (page 2 of 3)

Fixed Prosthodontics

13. Review fixed bridgework if there is no evidence of preventive services within the previous 18 months.
14. Review fixed bridgework if there is no evidence of preventive prophylaxis within 18 months following placement.
15. Review temporary partial if not replaced by permanent partial or fixed bridge within 18 months.
16. Review bridge if remade within 5 years of placement.
17. Review bridge repairs if performed within 5 years of placement.

Endodontics

18. Review root canal if followed by root canal or extractions of same tooth within 2 years.
19. Review post and core if followed by extraction or endodontics within 2 years.
20. Review root canal if preceded by restoration within previous six months.

Restorative

21. Review sedative filling if not replaced by permanent restoration, root canal, or extractions within 1 year.
22. Review core buildup if not followed by cast restoration within 18 months.
23. Review stainless steel crown if placed on permanent tooth in patient over age 16.
24. Review cast restoration if followed by endodontics or extraction of same tooth after 6 months but before 2 years.
25. Review amalgam restoration if replaced with amalgam restoration after one month but before 2 years.
26. Review composite restoration if replaced with composite or amalgam within 2 years.
27. Review three or four surface restoration if replaced within 6 months by a stainless steel crown.

Table 7 (page 3 of 3)

Oral Surgery

28. Review fracture if no follow up radiograph is taken within 6 months.
29. Review of bony tumor if no follow up radiograph is taken within 3-15 months after excision.
30. Review extraction, excision, incision, if no radiographs are taken within 2 years prior to procedure.

Periodontics

31. Review periodontal surgery if performed on patients under 25 years old.
32. Review complete occlusal adjustment if there is no evidence of complete radiographs within 3 years prior to the procedure.
33. Review more than four selected periodontal services if performed within 1 year.
34. Review more than one periodontal scaling and root planing if performed within 3 months.
35. Review periodontal surgery if followed within 3 years by more than three extractions.
36. Review periodontal surgery if followed within 3 years by complete denture.
37. Review periodontal surgery if there is no evidence of radiographs within 2 years prior to the procedure.
38. Review periodontal surgery if not followed within 18 months by preventive periodontal recall.

Preventive

39. Review more than four quadrants of sealant treatment if performed within 1 year.
40. Review sealant treatment if provided to patients under age 6.
41. Review sealant treatment if provided to patients over age 16.
42. Review "other preventive services" (dietary planning, oral hygiene instruction, preventive training) if provided more than four times in 1 year.
43. Review more than four dental prophylaxes if performed within 1 year.

3.4 CRITERIA AND STANDARDS

There would appear to be little point in attempting to assess the quality of care unless there were appropriate criteria and standards set by which performance could be evaluated. Lembcke (1956) introduced the use of specific criteria in a scientific method of clinical auditing and it is from his work that many of the quality assurance techniques of today have been developed. The use of criteria in the evaluation of care is just as important as in the teaching process where task analysis and the use of performance criteria form an integral part of educational technology. The need for development of specific written criteria to evaluate accurately and objectively clinical performance in dental undergraduate education has been identified by Mackenzie (1973).

Bailit (1985) defines criteria as "simply guidelines that state what dentists should or should not do; for example, 'Class II amalgam restorations should not have gingival margin overhangs'", whereas he considers that standards establish "the percentage of times a criterion must be met for the care to be considered adequate or acceptable". Bailit describes the use of literature reports in addition to clinical judgement in the setting of standards.

At the University of Alabama, a manual outlining criteria has been used as a standard reference in the evaluation of selected restorative procedures (Hammons & Jamison 1973). Burrell and Rasmussen (1977), at the Department of Endodontics, Louisiana State University, School of Dentistry, describe the development of an

evaluation system for pre-clinical and clinical endodontic teaching based on the development of performance standards and criteria, and clearly defined criteria form an important part of the training course in self evaluation conducted by the University of the Pacific, Department of Pediatric Dentistry (Abrams and Kelley 1974). Soricelli (1968) has described a method using criteria developed within a dental faculty to assess completed work as "Superior", "Highly Satisfactory", "Acceptable" or "Improvement Needed". It should be noted, however, that traditional academic criteria for, say, evaluating dental restorations may not be always practical for use in a quality assessment programme.

3.4.1 Characteristics of Criteria

Lembcke (1956) has established the following principles for developing criteria to be used in quality of care evaluation, namely:

1. objectivity
2. verifiability
3. uniformity
4. specificity
5. pertinence
6. acceptability

Gotowka, Bailit and Ellis in 1982 laid down a number of essential characteristics for quality assurance criteria.

1. Evidence must exist to suggest that adherence to the criteria will lead to improved patient health.
2. The criteria must be stated in a manner that allows objective

judgements to be made from data present in patient records.

3. The criteria must be appropriate to the goals of the topic.
4. The criteria should be few and independent, each addressing a different aspect of care.

The level at which a standard is set must be addressed. There is little point in setting standards which only a few clinicians are able to achieve and Abramowitz and Mecklenberg (1972) have pointed out that emphasis on the achievement of perfection may well discourage the dentist from seeking to improve performance if the standards set are unattainable. Standards of performance should, therefore, be established at the minimum measurable levels for satisfactory but achievable performance.

Donabedian (1981) asserts that quality assessment requires specification of:

1. a set of phenomena which are usually attributes of process or outcome;
2. a general rule of what constitutes goodness; and
3. a precise numerical component of what constitutes acceptable or optimal success with respect to each of these phenomena.

He says that the terms "criteria", "norms" and "standards" as currently employed do not correspond well with the above three components but could be used effectively if the basic distinctions were understood. Alternatively, he says, one could use the terms "elements", "parameters" and "standards". He is critical of the abuse of terminology as above (criteria, norms and standards) although he

says that he would prefer to use these three concepts if they had not become so confusing.

3.4.2 The Effect of Specific Criteria on Reliability

A paired-comparison experiment to examine peer assessments was conducted using two groups, six staff surgeons and six surgical residents. Each group made paired-comparison judgements about each other (including themselves) and similar paired-comparison judgements about the other group. Results showed that there were significant differences among residents when judged by either surgeons or residents and among surgeons when judged by either surgeons or residents (Smith, Chan, Chalmers, Reitman & Sacks 1984). It reinforced the hypothesis that practising physicians make subjective but consistent judgements about their peers.

The use of criteria is absolutely necessary to convert subjective judgements into objective assessments which can be validated. A review of research shows that simple objective criteria are effective in quality assessment and that training in evaluation may further improve reliability (Patridge & Mast 1978). The use of specific criteria to improve the reliability of assessment of quality of care has also been supported in a report on the evaluation of student restorations when the lack of agreement within and between evaluators was attributed to a lack of well-defined criteria (Salvendy, Joost, Cunningham, Ferguson & Dees 1976). Abou-Rass (1978) has described how wide-ranging scales have not been successful for assessing the quality of dental care as the use of broad grading categories is

likely to decrease reliability. On the other hand, while consistency among examiners is improved by reducing the number of assessment gradings, he maintains that there is a danger that there may be some loss of discrimination in the evaluatory scale. The lack of validity and reliability of peer review judgements which depended on clinical judgement rather than examination using strict criteria is illustrated in a study by Draker (1970). In this study, experienced clinicians determining indications for orthodontic treatment showed less than 38% reproducibility of decisions between examiners. In an experimental course in operative dentistry, it was found that differences between raters and rater-subscale interaction prevented a conclusive evaluation of the results (Darby, Chen & Podshadley 1965). Gaines, Bruggers and Rasmussen (1974) report a study which measured the differences between raters of a student pre-clinical prosthodontic course using different types of criteria. It was found that the use of detailed objective criteria reduced inter-rater variability very significantly.

The validity of explicit process criteria utilised in most quality assessment studies has been questioned (Nobrega, Morrow, Smoldt & Offord 1977), in particular as such criteria have usually concentrated on clinical features rather than including the humanitarian elements of general patient care. In this article by Nobrega et al, clinicians are reminded that they must be aware of the limitations of such assessments if data is to be used for improvements in health care.

The nature of the criteria employed must be clear to the reviewer or

the validity of the assessments could be compromised. In a study which compared evaluations made by first year dental students with those of their instructors in a pre-clinical operative dentistry course, it was shown that the students did not perform particularly well as assessors, suggesting that they had a poor understanding of the criteria involved (Hinkelman, Long & Scott 1982).

3.4.3 Formulating Criteria

Several approaches have been described in formulating criteria for assessment of the quality of care. An attempt was made in the 1960s to develop a set of defined standards of what should represent good dental care, using the opinions firstly of an expert panel and then submitting these opinions for review to a larger group of dentists. Using this consensus approach, definitions were established of the types of dental services which should be provided, the sequence in which they should be given, how often, by whom, for whom, where, the number of visits needed, the time spent at these visits, the factors which interfere with the provision of good dental care and the consequences on dental health of not receiving care (Schonfeld, Falk, Sleeper & Johnston 1967). Byrd and Adair (1982) have reported the development of nine criteria for evaluating the quality of restorative care using a round-table discussion format involving four pedodontic practitioners. These particular criteria were subsequently shown to be practical in clinical application. Similarly, Schonfeld (1977) has described the development of indexes and standards for use in the evaluation of care, based on interviews with dentists to ascertain their opinions as to appropriate guidelines. Perkins (1982)

has reported the use of consensus among participating dental practitioners to develop criteria for evaluation of three aspects of care in the community health service in London districts.

Abou-Rass (1978) has endorsed the use of objective criteria in the evaluation of dental care in order to overcome the lack of training and subjective opinions of the evaluators. He espoused a critical error approach to the development of performance criteria and clinical evaluation of same based on the following ten steps:

1. selection of a performance criteria evaluation committee and development of a statement of responsibilities of members;
2. determination of an evaluation philosophy and goals;
3. selection and analysis of essential procedures;
4. development of criteria;
5. development of critical error listings;
6. development of a performance evaluation manual;
7. field testing;
8. departmental orientation and teacher inservice training;
9. finalisation and implementation; and
10. administration of the evaluation model.

3.4.4 Practical Applications of Criteria and Standards

At the University of Alabama, written criteria were used to evaluate the quality of service provided by dental therapists, evaluation being carried out by direct examination of patients (Hammons, Jamison & Wilson 1971).

Cons (1971) describes the guidelines developed by the Bureau of Dental Health of the New York State Department of Health for post-treatment assessment of the quality of dental care. Details of these criteria are listed in Table 8. Each item is assessed as either "Good" or "Poor".

The system of quality assurance developed in the U.S. Indian Health Service (Abramowitz & Mecklenberg, 1972) is based on the definition of minimum acceptable levels of performance which form the pre-determined standards by which all services can be evaluated. To facilitate development, the I.H.S. classified its programme for controlling quality into three elements relating to the individual service, total patient and the community phases as exemplified in Tables 9, 10 and 11.

Table 8 Bureau of Dental Health Guidelines for Post Treatment Evaluation (page 1 of 3)

Source: Cons (1971) p105-106

- I. Examine all treatment supplied and make appropriate notations concerning treatment "billed for", but not present in the mouth. Record if the treatment has been "billed for" or "not billed for" and is not present in the mouth by using the listed symbols only.

II. Evaluation

A. Restorations

Look for extension of cavity; decide whether the restoration satisfies form and function; is properly contoured, with good embrasures and correct areas of contact; and note whether all margins are finished and the restoration polished (for example, a new DO should not be locked into an old amalgam MO, but should be cut out completely and a new MOD placed). Look for overhanging margins. The lapse of time since treatment was rendered should be considered, if a new carious lesion is present in a restored tooth.

B. Crowns; Fixed Prosthesis

1. Must have acceptable occlusion.
 - a. Other than ideal occlusion is acceptable when one quadrant only is affected;
 - b. Check for traumatogenic occlusion produced by cementation;
 - c. Occlusal anatomy should conform to the pattern of other teeth in the mouth.
2. Must have marginal fit
 - a. which permits reasonably free passage of an explorer over the margins;
 - b. which should not be sensitive at the gingival margin.
3. Casting for abutment must be
 - a. contoured labially and lingually in proper alignment with the adjacent teeth, and slightly narrower occlusally than adjacent teeth;
 - b. well opened at embrasures for freedom of interproximal papillae;
 - c. must be prepared with very light contact between tissue and pontic and permit no blanching.
4. Soldered areas should resemble areas of contact found in natural teeth, and be wide enough only to gain sufficient strength.

C. Root Canal Fillings

1. Pulpotomy should not be accepted as a final procedure in permanent teeth but is acceptable as a temporary measure in a central incisor of a young child until the apex of the root is fully formed, when the tooth should have a complete root-canal filling;

Table 8 (page 2 of 3)

C. Root Canal Fillings cont'd

2. Keep in mind that a tooth which has been treated with calcium hydroxide may look as if a carious area exists under the restoration in a radiograph;
3. The filled tooth should have prior and postoperative radiographs for evaluations:
 - a. the radiograph of a first bicuspid should show both root canals (the buccal canal will be the distal canal on the film);
 - b. the radiograph of a lower first molar should show both canals on the mesial root;
 - c. to see all three apices of an upper first molar, two radiographs will be required;
 - d. the canal should be filled to the apex of the root and be completely filled laterally;
4. If a radiolucent area still remains at the apex of the root soon after filling has been placed, the treatment is not to be condemned because this area may become radiopaque some months later.

D. Periodontal Treatment

1. Recession of soft tissue should be present (except in the palatal tissue) if any worthwhile periodontal treatment has been completed;
2. If the calculus present is stained a dark green or brown, recent scaling is unlikely.

E. Complete Dentures

Check to see that the occlusal plane of the complete lower denture is below the retromolar pad. The occlusal plane of the teeth should be below the tongue when it is in a normal position. Generally, the lower first molar should be set approximately 2mms below the retromolar pad. Inability of the patient to chew properly, or dentures with click on eating, result when the occlusal plane is set too high. If the patient bites his tongue frequently, excessive over-closure is likely. If the patient complains of general soreness, suspect that no freeway space exists, or teeth are set too wide bucco-lingually, or the vertical height is increased.

1. Esthetic appearance should be acceptable to both patient and examiner;
- 2&3. Retention and stability must be acceptable. If the complete upper denture tips on pressing in the region of the second bicuspid then it likely is too short at the tuberosity;
4. For muscle attachments look to see if the labial frenum, other muscle attachments, and the palatinus torus (if present) have been relieved sufficiently;
5. Check to see that the centric relation is correct;
6. Check the working relation to see if contact on the working side is made from the cuspid to the second molar;
7. To check the mode of speech, see if the patient can enunciate clearly.
8. To gain the patient's reaction, find out whether he(she) likes the denture(s).

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F. Partial Denture(s)

1. Check to see if esthetics are acceptable and find out whether the patient likes the appearance.
2. Determine whether the functional design is correct. If a periodontal condition has existed, generally the denture requires more clasps than normally would be used. The framework for all partials should be of cast metal. Generally, do not accept the partial if it has a wrought lingual bar. If the natural lower anteriors are tilted labially check for more space between the lingual mucosa and the lingual bar. For an upper partial denture, examine the primary tissue bearing area; bear in mind that the casting should keep away from the necks of the teeth, that an upper palatal bar should not extend too far back, that covering a hard area should be avoided, and that one can use either an anterior or posterior bar or a double bar.
3. For retention, clasps with occlusal rests, approximately one third the size of the occlusal surface of the clasped tooth should be used. Rests should have seats prepared for them. If one arm of a clasp is too high and one is too low, then the clasps are likely not to be good.
4. Stability should be tested for every partial denture.
5. To test rigidity squeeze the ends of the denture; it should be rigid, not flexible, and a lingual bar never should be set too high on the teeth.
6. Occlusion should be tested in every patient.

Table 9 Examples of standards, criteria and methods for
 evaluating the quality of service.

Source: Abramowitz & Mecklenberg (1972) p98.

- I. A. Standard for a dental prophylaxis: No debris, calculus or extensive stain exists on the clinical crowns of any teeth in the mouth in 80 percent of the persons checked.
- B. Criteria for a dental prophylaxis (All criteria must be met for a prophylaxis to be satisfactory):
 - 1. Soft material is not detectable by sight or instrument on any tooth;
 - 2. Extensive stain is not present except where etched in the surfaces or in the crevices of teeth;
- C. Method:
 - 1. The sample for an examination must include at least 10 patients;
 - 2. Each person examined must not have eaten since the service was provided;
 - 3. The examination must be performed within six hours after completion of the prophylaxis.

- II. A. Standard for an amalgam restoration (85 percent of amalgam restorations checked are satisfactory).
- B. Criteria for an amalgam restoration (All criteria must be met for a restoration to be satisfactory):
 - 1. The contour of the surface approximates normal anatomy for the tooth;
 - 2. All cavosurface margins are intact;
 - 3. Amalgam does not extend beyond or lie short of the cavosurface margin at any point;
 - 4. Proximal restorations are in contact with adjacent teeth at the normal contacting area;
 - 5. Appropriate function of the tooth is restored;
 - 6. The restoration is not porous.
- C. Method:
 - 1. The sample for an examination must include at least 30 restorations;
 - 2. Each restoration must be at least 48 hours old;
 - 3. Mirror, explorer and a dental light must be used in the examination of each restoration;
 - 4. Interproximal surfaces must be air-dried when checked for contact;
 - 5. Radiographs must be used to check interproximal areas inaccessible to sight.

Table 10 Examples of standards, criteria and methods for evaluating the quality of patient care..

Source: Abramowitz & Mecklenberg (1972) p98-99.

- I. A. Standard for managing patients: 95 percent of patients are treated with respect.
- B. Criteria for evaluating management of patients:
 - 1. The patient's presence is recognized within two minutes of entering the dental waiting room;
 - 2. The patient's questions and remarks receive a response by at least one member of office-staff;
 - 3. The patient's dental problems are discussed with the patient or parent or guardian;
 - 4. Treatment is explained to the patient, or the parent or the guardian, before services begun;
 - 5. The patient or the parent or the guardian accepts the plan for treatment that is offered;
 - 6. Tact, courtesy and empathy are provided for each patient;
 - 7. The patient is satisfied with the treatment.
- C. Method:
 - 1. For criteria one through six, at least 20 patients are observed throughout a visit;
 - 2. For seven, at the close of the visit, the patient is asked "Are the people in this office nice?" "Are you satisfied with the dental services you received today?"
- II. A. Standard for the protection of patients: a medical history is obtained and a complete plan of treatment formulated for at least 95 percent of the persons examined.
- B. Criteria for evaluating the protection of persons:
 - 1. The patient is asked about his current state of health;
 - 2. The patient is asked about his medical history;
 - 3. The patient's medical chart is reviewed if available;
 - 4. Both hard and soft tissues are examined;
 - 5. A record of systemic and intraoral findings is written at the time the examination is performed.
 - 6. A plan of treatment is written on the patient's record when diagnosis is completed.
- C. Method:
 - 1. At least 20 patients are observed as they are examined;
 - 2. The patients examined should not have been treated by the examining dentist within the last four months to ensure that the procedure followed is not for patients fresh in the mind of the examiner.

Table 11 Examples of standards, criteria and methods for evaluating the quality of care in the community.

Source: Abramowitz & Mecklenberg (1972) p99.

- I. A. Standard for the level of oral health in a community: There are no more than 6.00 teeth per person missing in those patients examined from the age-group of 65-70 years.
- B. Criteria for levels of oral health: The age-adjusted rate per person for selected levels of oral health care equal to or less than
 1. 0.900 debris index;
 2. 0.600 calculus index;
 3. 0.113 overt periodontal disease;
 4. 1.236 primary teeth with caries-experience (dmf);
 5. 0.544 primary teeth in increment of caries-experience;
 6. 9.008 permanent teeth with caries-experience (DMF);
 7. 0.900 permanent teeth in increment of caries-experience.
- C. Method:

The data of the community computed for the fiscal year - "Expected-Disease-Occurrence-Report-Age-Adjusted Rates".
- II. A. Standard for the completeness of services in a community: No less than 90 percent of the services required are provided in any one year for persons examined in the IHS program of direct service.
- B. Criteria for the completeness of services:
 1. 95% of persons examined receive a prophylaxis;
 2. 95% of teeth requiring restorations are restored;
 3. 98% of teeth requiring extraction are removed;
 4. 99% of surgical procedures required are provided;
 5. 85% of space-maintainers required are placed;
 6. 80% of prosthetic units required are delivered;
 7. 75% of periodontic services required are provided;
 8. 80% of interceptive orthodontic appliances are placed;
 9. 60% of corrective orthodontic appliances are placed.
- C. Method:
 1. Data are computed from the data reported monthly and for the fiscal year - "Clinical Progress Report";
 2. Computations for prophylaxis include persons who received either a topical application of fluoride or a prophylaxis.

As early as 1963, Friedman, in California, had published "A Basic Guide to Qualitative Standards for the Evaluation of Dental Care Programs" as a tool for measuring the type and quantity of treatment necessary for provision of the highest quality of care (Friedman, 1977a). The Guide implied standards although it did not issue them as directives and, in 1972, Friedman issued a "Guide for the Evaluation of Dental Care" which provided a method for direct and indirect quality evaluation (Friedman 1977b). In this publication, unlike his previous one, specific criteria were listed and emphasis was placed on their use in indirect assessments such as evaluation of radiographs, models and treatment records. In the same year, he presented a paper at the National Dental Health Conference in Chicago, in which he discussed the incorporation of explicit criteria and standards in a dental care index which could be used to evaluate dental health status and thus the outcome of particular care programmes (Friedman 1977).

Ryge and Snyder in 1973 published an investigation on the development and testing of process standards for assessing the technical quality of restorations, and further standards of dental care were developed by a group of nine general dentists and faculty members with results of testing showing high reliability and moderate variability and validity (Bailit, Koslowsky, Grasso, Holzman, Levine, Valluzzo & Atwood 1974). Table 12 shows an example of criteria used by this group to assess history and examination, treatment planning and treatment. An important feature of this study was that private dental practitioners, without special expertise or training, were shown to be able to formulate reliable, valid and practical criteria within a

Table 12 Examples of criteria used to assess history
 and examination, treatment plan and treatment.
 (page 1 of 2)

Source: Bailit, Koslowsky, Grasso, Holzman, Levine, Valluzzo & Atwood
(1974) p846.

History and examination

Medical history: For an adequate medical history, these data should be in the record:

1. A general description of the patient's general health, including past serious illnesses.
2. In addition to a general statement of the patient's health, specific references should be made to these conditions: sensitivity to drugs and other allergies, rheumatic fever, bleeding problems, liver and kidney disease, heart disease, diabetes, and pregnancy status (if female of child-bearing age).
3. The names of the patient's personal physicians (if any).
4. The date of the patient's last visit to a physician for a physical examination.
5. The medications being taken by the patient (if any) and the reasons for taking them.

Treatment plan

Sequence of treatment: In most instances there is an orderly sequence of priorities in planning a patient's care. Although some patients will not require certain treatments such as referral to a physician, treatment plans should follow the general sequence listed here.

As a broad guideline, the patient's chief complaint should be dealt with on the first visit. Of course, if the complaint concerns the need for dentures or other treatments that cannot be provided until extensive dental or medical care is completed, the chief complaint cannot be responded to at the beginning of treatment.

This sequence of treatments is recommended:

1. Alleviation of acute conditions (pain, bleeding, or acute infection) or the chief complaint.
2. Consultation with or referral to a physician for systemic evaluation.
3. Placement of the patient on antibiotics or other premedications.
4. Institution of primary prevention programs such as oral hygiene instruction, prophylaxes, plaque control or fluoride treatments.
5. Control of deep caries that may cause pulpal exposure. (The sequence of items 6 through 10 is interchangeable.)
6. Extractions and soft tissue surgery.
7. Treatment of teeth endodontically.
8. Treatment of the periodontium.
9. Treatment of orthodontic problems.
10. Adjustment of occlusion.
11. Operative treatment of teeth (restorations).
12. Replacement of teeth prosthetically.
13. Recall examinations and maintenance treatment.

Table 12 (page 2 of 2)

Treatment

Complete dentures: The factors considered in judging complete dentures are retention, stability, vertical dimension, extension of flanges, occlusion, placement of teeth over ridges, and appearance.

1. Retention

Retention in the maxillary denture should be sufficient to allow the patient to perform the normal mouth functions of talking, eating, and opening without dislodging the denture.

Retention in the maxillary denture should be strong enough to resist light hand pressure in a downward direction.

2. Stability

For both the maxillary and mandibular dentures, there should be only slight movement in a plane horizontal with the ridge, when light twisting pressure is placed on the denture by the hand.

3. Vertical dimension

The teeth should not come in contact when the patient talks. There should not be excessive free-way space with overclosure when the teeth are in contact.

4. Extension of the flanges

The flanges of the denture should be to the depth of the mucobuccal folds without displacement of tissue.

On the lingual aspect of the mandibular denture, the flanges should make contact with the floor of the mouth at rest and should not dislodge the denture when the tongue is extended to moisten surface of the lower lip.

5. Occlusion

There should be bilateral contact of all molar teeth.

There should be no movement of denture bases when the teeth are in light occlusion.

With repeated closure, the teeth should meet without sliding.

6. Placement of posterior teeth

The buccal cusps of the molar should be placed over the alveolar ridge in the mandibular denture.

7. Appearance

The shade of the teeth should blend with the patient's remaining natural teeth (if any) in the opposite arch.

The labial position of the maxillary anterior teeth should provide adequate support to the lips.

six month period.

Subsequently, a rating system and specific criteria were developed based on input from generalist and specialist practitioners, peer review society members and health insurance representatives. The proposed rating systems were operationally based with specific criteria spelt out for each category (Ryge 1975). This rating system utilised categories for restorations developed earlier by Ryge and Snyder (1973) in which the restorations were evaluated according to a system of two quality designations and four optional categories (Table 13). Specific criteria were developed for each of the four operational categories and are illustrated in Table 14. The use of these four categories has subsequently formed the basis for a number of established quality assurance systems, beginning with that published in the California Dental Association guidelines in the mid seventies and still being utilised in the more recently developed systems such as the model developed for the state of Michigan. Both of these systems are described in Chapter 8 of this treatise.

The evaluating dentist assigns the restoration to that category consistent with its lowest rating and indicates the specific criterion or criteria which produced this rating, by specifying a key word for all ratings below the top one, as illustrated in Table 15. This system was field tested at three army installations and found to be a valid and objective tool for measurement of the quality of restorations. Using Ryge's criteria as a basis, thirteen working sets of clinical criteria and a rating system for evaluating post-treatment dental records in different practice settings were later

Table 13 Rating system for quality evaluation

Source: Ryge & Snyder (1973) p372.

	OPERATIONAL CATEGORY	OPERATIONAL EXPLANATION
S A T I S F A C T O R Y	Meets all Standards	The restoration is of acceptable quality and is expected to adequately protect the tooth and the surrounding tissue.
	Observe at Next Visit	The restoration is of satisfactory quality, but exhibits one or more features which might lead to premature failure.
N O T A C C E P T A B L E	Replace for Prevention	The restoration is not of acceptable quality. Future damage to the tooth and/or its surrounding tissues is likely to occur.
	Replace Statim	The restoration is not of acceptable quality. Damage to the tooth and/or its surrounding tissues is now occurring.

Table 14 Quality evaluation criteria (page 1 of 2)

Source: Ryde & Snyder (1973) p373.

OPERATIONAL CATEGORY	SURFACE AND COLOR	ANATOMIC FORM	MARGINAL INTEGRITY
MEETS ALL STANDARDS (a)	Surface of restoration is smooth. No irritation of adjacent tissue. No mismatch in colour shade and/or translucency between restoration and adjacent tooth structure.*	Restoration's contour is continuous with existing anatomic form; restores contours, cusps, planes, grooves, and marginal ridges adequately.	No visible evidence of a crevice along the margin into which the explorer will penetrate. No discoloration on the margin between the restoration and tooth surface.*
OBSERVE AT NEXT VISIT (b)	Surface of restoration is slightly rough or pitted; can be refinished. Mismatch between restoration and tooth structure within the normal range of tooth color, shade, and/or translucency.*	Restoration is slightly undercontoured: Occlusal contour not continuous with that of cusps and planes, OR Occlusal height reduced locally (not in toto), OR Marginal ridges slightly undercontoured (low), OR Contact slightly open (may be self-correcting), OR Facial flattening, OR Interproximal cervical area slightly under-contoured. Restoration is slightly overcontoured, but excess material could be removed.	Visible evidence of a crevice along the margin into which the explorer will penetrate. Discoloration on the margin between the restoration and the tooth structure.*

Table 14 (page 2 of 2)

OPERATIONAL CATEGORY	SURFACE AND COLOR	ANATOMIC FORM	MARGINAL INTEGRITY
NOT A CCEPTABLE	Surface deeply pitted irregular grooves (not related to anatomy); cannot be refinished.	Restoration is undercontoured: Dentine or base is exposed, OR Occlusion is affected, OR Contact is faulty (self correction is unlikely), OR Interproximal cervical area undercontoured; tissue damage likely. Restoration is overcontoured: Contour cannot be adjusted properly; OR There is marginal overhang.	Dentin or base is exposed. Discoloration has penetrated along the margin of the restorative material in a pulpal direction.*
	Surface is flaking or fractured. Esthetically displeasing color, shade and/or translucency.*	Restoration is missing, OR Traumatic occlusion, OR Restoration causes pain in tooth or adjacent tissue.	Mobile or fractured restoration, OR Caries continuous with the margin of restoration, OR Tooth structure fractured.

*Criteria apply to anterior restorations

developed and tested at the University of North Carolina (Williams 1976).

Anaise and Ehrlich (1977) have criticised earlier methods of establishing criteria, such as those developed by Soricelli, Ryge and Snyder as being limited in approach and not exhibiting ideal reliability among examiners. They have developed an alternate approach using 14 specific criteria for evaluating restorative quality, see Table 16.

Greene (1972) refers to the limitations in dentistry in confining evaluation of care to the assessment of completed treatment. Using as a model the approach of the American board of Orthopedic Surgery which recognised similar problems with its technique-oriented discipline, he identified five separate assessment areas which could be used to evaluate over-all performance, namely:

1. diagnosis, information gathering and problem solving;
2. selection of treatment;
3. operating technique;
4. relating to the patient;
5. professional behaviour as an individual and in relation to colleagues and instructors.

Criteria for assessing students performance as either effective or ineffective under these five headings are detailed in Table 17.

Bailit (1985) gives excellent examples of quality criteria related to

process and outcome (Table 18).

A four point scale for assessing the quality of restorations in children in which individual restorations were considered only as part of the assessment of all restorations present was reported by Bagramian, Jenny, Woodbury and Proshek (1975). Abou-Rass (1973) described a method using strictly detailed criteria for evaluating endodontics and Wuerhmann (1974) outlined a method for intra-oral radiographic film quality also using specific detailed criteria to establish standards of acceptability. Mayes (1974) describes a similar system to that of Wuerhmann for evaluation of radiographs under the Blue Shield Program. While not strictly a quality assurance exercise, the experimental dental care project conducted by the London Hospital Medical College (Allred 1977) had as a feature the adherence to strict criteria for assessing the quality of dental care. For full denture work, Razzoog and Lang (1978) describe a set of detailed criteria which they developed for both individual clinical and laboratory stages. More recently, an assessment scale has been developed at the University of Groningen in the Netherlands for the evaluation of denture quality, using a system of nine weighted criteria (Vervoorn, Duinkerke, Luteijn, Bovman & van der Poel 1987). Other criteria systems for evaluation of the quality of dental care have been reported by Houpt and Kress (1973), Hinkelman and Long (1973) and Feil (1982).

Table 15 Quality evaluation key words
Source: Ryge & Snyder (1973) p374.

OPERATIONAL CATEGORY		C H A R A C T E R I S T I C		
		SURFACE AND COLOUR	ANATOMIC FORM	MARGINAL INTEGRITY
S A T I S F A C T O R Y	MEETS ALL STANDARDS (alfa)	(Not Applicable)	(Not Applicable)	(Not Applicable)
	OBSERVE	Rough	Occlusal Contour or Occlusal Height or Marginal Ridge or Contact bravo or Facial or Lingual or Proximal bravo or Slightly over-contoured	Crevice
	AT			
	NEXT VISIT (bravo)	----- *Slight mismatch		----- Discolora- tion
N O T A C C E P T A B L E	REPLACE	Pitted	Dentin or Base or Contact charlie or Proximal charlie or Over-contoured or Overhang	Margin: dentin or Margin: base
	FOR	-----		-----
	PREVENTION			
	(charlie)	*Mismatch		*Penet- ration
	REPLACE	Surface fracture, or Flaking	Missing or Traumatic occlusion or Pain	Mobile or Cracked or Caries or Tooth Fracture
	STATIM	-----		
	(delta)	*Unaesthetic		

*Criteria apply to anterior restorations only

Table 16 Criteria for evaluating quality of dental restorations*

Source: Anaise & Ehrlich (1977) p59

No.	Explanation	Yes	No	<u>Not</u> Applicable
1.	<u>Smooth marginal adaptation</u> of the filling material is secured at the junction of cavity outline and the surface of the tooth.	—	—	—
2.	The restoration follows the principles of <u>extension for prevention</u> so that all pits and fissures are included in the cavity outline and the margin is accessible for polish and a cleansing of the margins can be secured by toothbrushing.	—	—	—
3.	Restoration does not <u>extend beyond or lie</u> short of the cavosurface margin at any point.	—	—	—
4.	Appropriate <u>contact</u> with adjacent tooth or teeth is restored at normal level of <u>marginal ridge</u> .	—	—	—
5.	Appropriate <u>contact</u> with adjacent tooth or teeth is restored at equal level of <u>marginal ridge</u> .	—	—	—
6.	Appropriate <u>occlusion</u> of the tooth is restored.	—	—	—
7.	The <u>contour</u> of the restoration follows the normal anatomy of that restored tooth.	—	—	—
8.	The restoration is not <u>porous</u> .	—	—	—
9.	The restoration is <u>polished</u> .	—	—	—
10.	<u>Aesthetic</u> function of the tooth is restored.	—	—	—
11.	No <u>overhanging</u> margins can be explored.	—	—	—
12.	The crown's <u>margins</u> are below the free gingiva.	—	—	—
13.	The <u>pontic</u> touches the gingival tissue.	—	—	—
14.	No inflammatory reaction of <u>gingival tissue</u> to restoration is noticeable.	—	—	—

*The criteria do not apply in all instances: e.g. criteria nos. 4, 5, 10 & 11 do not apply to class one restorations; criteria no. 10 applies only to aesthetic restorations; criteria no. 5 does not apply in cases of missing opposing teeth, or partially erupted malposed teeth; and criteria nos. 1, 2 & 8 do not apply to crowns.

Table 17 Criteria for student performance

(page 1 of 2)

Source: Greene 1972 p24-25.

Factor I—Diagnosis, Information Gathering, and Problem Solving*

Ineffective

- A. The ineffective dental student limits his interview and physical examination to the area of complaint.
- B. He does not have a sufficient understanding of the implications of various medical problems in relation to oral diagnosis. Therefore, he either fails to recognize variations from the usual pattern or disregards them when they do appear.
- C. He makes decisions on the basis of experience, disregarding the context in which that experience was obtained. His modus operandi in making a diagnosis is largely empirical, for example, using therapy to substantiate a diagnosis.
- D. In general, his diagnostic conclusions are incorrect or incomplete.

Effective

- A. The effective dental student routinely takes a comprehensive dental history and carries out a thorough oral examination.
- B. He appreciates the importance of general medical information as it pertains to complete oral diagnosis, and he initiates questions and procedures to obtain that information.
- C. He employs basic biological principles and criteria when making decisions between alternative hypotheses or procedures. In doing so, he makes proper use of resource material, both printed and human.
- D. In general, his diagnostic conclusions are correct or defensible.

*This factor is concerned with the student's ability and skill in gathering information and using it in developing a complete diagnosis.

Factor II—Selection of Treatment*

Ineffective

- A. The ineffective dental student selects treatment according to a set formula or a favorite technique for each clinical problem, without due regard for his own ability to carry out that treatment properly.
- B. His treatment choice is rigid and inflexible, despite the special nature of a particular case. Because he is not aware of the full range of current concepts and techniques, his selections of therapy tend to be narrow and unimaginative.
- C. The treatment he has selected is either inadequate or inappropriate.

Effective

- A. The effective dental student selects treatment according to the specific indications, while also considering his own capabilities and limitations at his current level of training.
- B. He chooses simple and conservative procedures whenever possible, but he is flexible enough to modify treatment when the situation requires it. For unusual problems, he devises creative solutions based on sound rationales.
- C. The treatment he has selected is adequate and appropriate for this situation.

*This factor is concerned with the student's ability to use sound judgment in planning for and carrying out treatment procedures.

Factor III—Operating Technique*

Ineffective

- A. The ineffective dental student has insufficient skills for the procedures he is attempting.
- B. His over-all handling of instruments and tissues lacks finesse.
- C. He becomes upset by failures or by unforeseen complications which arise during the procedure, or he does not recognize errors when he has made them.
- D. His unfamiliarity with the procedure or his lack of planning cause him to take unacceptable shortcuts, or to prolong the procedure unnecessarily.
- E. The over-all quality of the technical work done during this procedure was marginal or poor.

Effective

- A. The effective dental student has the necessary skills for carrying out the procedure he is attempting.
- B. He uses appropriate instruments for each procedure, and he handles both hard and soft tissues with proper respect.
- C. He reacts rationally to unexpected developments either by modifying the procedure or by seeking appropriate help and advice.
- D. He carries out the task properly to completion and in a reasonable amount of time.
- E. The over-all quality of the technical work done during this procedure was good or excellent.

*This factor is concerned with the student's ability and skill in carrying out operative procedures.

Table 17 (page 2 of 2)

Factor IV—Relating to the Patient*

Ineffective

- A. The ineffective dental student does not demonstrate a personal interest in the patient as a human being. Instead, he seems more concerned about the technical procedures or about his own situation as a student.
- B. He carries out the treatment procedures without discussing them with the patient or trying to "educate" the patient.
- C. His preoccupation with completing the procedure outweighs his consideration for the patient's comfort.
- D. He does not project an attitude of confidence or competency, and this tends to worry or even alarm the patients. He reacts negatively to hostility or other emotional displays.

Effective

- A. The effective dental student demonstrates a personal interest in the patient's well-being. For example, he tries to select therapy which is compatible with the patient's needs, desires, and general life circumstances.
- B. He communicates clearly with the patient about his dental problems and how he proposes to deal with them.
- C. He monitors the patient's reactions and considers his comfort throughout the procedure.
- D. His general manner elicits confidence and cooperation from the patients. They tend to like him and feel that they can ask questions and discuss problems with him. He reacts well to any sign of fear or hostility on the part of the patient.

*This factor is concerned with the student's effectiveness in communicating and working with his patients.

Factor V—Professional Behavior*

Ineffective

- A. The ineffective dental student has difficulty relating to others and lacks the ability to give or take instructions gracefully.
- B. He attempts to cover up his errors instead of seeking help and working out his problems.
- C. He cannot function well in a clinical situation without constant supervision.
- D. He is frequently absent or late for assigned duty or appointments, or he is not available when needed.
- E. In general, his conduct does not seem appropriate for a professional person.

Effective

- A. The effective dental student relates well to others and communicates easily, working harmoniously in a team situation.
- B. He seeks consultation and advice when appropriate and he respects the views of others.
- C. He can function independently in a clinical situation and complete procedures properly without constant supervision.
- D. He is reliable and punctual in keeping his clinical appointments and in fulfilling his duty assignments.
- E. In general, his conduct is appropriate for a professional person.

*This factor is concerned with the student's ability to conduct himself properly and to interact effectively with his colleagues, his auxiliaries, and his instructors.

Table 18 Process and outcome criteria

Source: Bailit (1985)

WHAT SHOULD HAPPEN

Process

1. Patients with multiple periodontal pockets should be seen every 6 months and receive prophylaxes and scalings.
2. Dentists referring patients to the practice for consultation should receive a letter informing them of findings and recommendations.
3. Dentures should have balancing side contacts in lateral excursion.

Outcome

1. Patients in maintenance care should be caries free at their 6-month recall visits.
2. Two years following gingival surgery, patients should have periodontal pockets less than 4mm in depth.
3. Patients should report being satisfied with the quality of care they received in practice.

WHAT SHOULD NOT HAPPEN

Process

1. Children below age 13 should not be given tetracyclines to control infection.
2. A maxillary lateral incisor should not be used as an abutment for a cantilever bridge to replace the canine.
3. Women in their first 3 months of pregnancy should not have radiographs taken, except in emergencies.

Outcome

1. There should be no "dry sockets" following third molar removal.
2. Patients with full dentures should not report problems with lisping.
3. The plaque scores of new patients receiving comprehensive care over a 2-year period should not increase from their initial values.

3.5 DIRECT EVALUATION

3.5.1 Use of Direct Assessment

Many of the established procedures of quality assurance are not readily translatable in a comprehensive manner to dentistry with its inherent emphasis on practical technique. The development of the criteria audit by Lembcke (1956) and the subsequent use of this technique in medicine, has been centred around the record audit. In dentistry, recorded data has much more limited scope and while the use of the record audit is discussed later in this section, there has been in the U.S.A. a tendency for review to be focused on direct evaluation of completed work. Direct observation or assessment of dental treatment retrospectively by patient examination is an obvious means of evaluating performance. However, the recall and examination of patients is not always practical and may raise ethical and legal difficulties, not to mention additional costs in time and manpower (Hillsman 1978; Bailit 1980b).

Tutors play this role in the training of undergraduate and postgraduate students and these traditional methods in themselves are a means of monitoring the quality of dental care.

Direct assessment by peers has been used in dental schools, public institutions and private practices to assess the quality of treatment. A study by Gruebbel (1950) of the New Zealand dental nurse utilised the end-result appraisal. Garg, Gliebe and Kleinberg (1979) report the application of peer review in the Medical

College of Ohio to assess performance in diagnosis, and Denehy and Fuller (1974) describe peer review for performance measurement in preclinical work in the Department of Operative Dentistry at the University of Iowa. Soricelli (1968) reports a review process that includes spot checks on treatment carried out by staff dentists of the Division of Dental Health in the Philadelphia Department of Public Health. In this exercise, examination and evaluation of restorations in children is carried out by members of the Faculty of the Temple University School of Dentistry. Hammons, Jamison and Wilson (1971) have described the evaluation of treatment performed by operative auxiliaries in an experimental programme at the University of Alabama, and in the Indian Health Service the quality review programme includes regularly scheduled reviews by each dentist's supervisor (Abramowitz & Mecklenberg 1972). Cons (1971) reports a method of checking the quality of treatment carried out under Medicaid in New York. The guidelines issued by the Bureau of Dental Health of the New York State Department of Health which are used in post-treatment evaluation involving direct examination of patients have been detailed elsewhere in this treatise. In 1972, Friedman and Schoen reported a pilot study in quality assurance carried out in two group practices in Los Angeles which included recall and direct examination of patients. A similar exercise was carried out in 1980/81 in eleven private practices in North Carolina by another group (Strauss, Lindahl & Barksdale 1983). In Washington State, several quality assurance studies involving the direct assessment of patients in the private practice situation have been undertaken (Milgrom, Weinstein, Ratener, Read & Morrison 1978b; Bergner, Milgrom & Chapko 1983). The accreditation of participating dentists in

various health insurance schemes in the U.S.A. has often involved the evaluation of the practice by visiting consultants, including examination of patients. Bernhardt (1974) reports the use of direct clinical review of patients in the California Dental Service. Bailit and Raskin (1978) describe a study conducted on behalf of the Blue Cross and Blue Shield Plans of New York in which 185 volunteers of a selection of 200 of the 6,000 employees covered under the Schemes were examined by evaluating dentists. Snyder (1983) gives yet another example of the credentialling of providers under the Winston-Salem Dental Care Plan in North Carolina by direct evaluation of patient care. In 1980, the Michigan Dental Association in cooperation with a number of insurance companies, produced a statewide peer review mechanism which includes direct review of patients in participating private practices.

Accordingly, this use of direct evaluation of dental performance has come to be reasonably common in U.S. quality assurance programmes. If one is to examine the current "state of the art" in established programmes, the peer review of patients is seen as a common thread, although not necessarily the major component of these evaluatory methods. The California Dental Association issued its guidelines in 1977 in which it specified the use of two dentists making independent evaluations of patients against sets of explicit criteria. Demby and Rosenthal (1978) describe the development of a quality assurance system developed at the Sunset Park Family Health Centre in the Lutheran Medical Center in Brooklyn, New York. Two years later a Reviewer Manual for the Sunset Park programme was produced after funding by the W.K. Kellogg Foundation through the National Dental

Quality Assurance Program of the American Fund for Dental Health. There is direct audit of patients under this programme (described in detail later in this treatise) by a trained dentist evaluator. The most recently developed quality of care evaluation instrument in the U.S.A. is that developed as part of the DEMCAD project (Morris, Kephart, Bailit and Vito, 1982). Once again, there is a component of direct clinical review of patients by dentists other than the treating clinician.

3.5.2 Advantages and Disadvantages of Direct Assessment

Widespread, then, as the use of direct evaluation is in the quality assurance environment in the U.S.A., such methods bring forward a number of difficulties and disadvantages. They are as follows.

1. **Cost.** The employment of expensive dentist manpower in reviewing the work of others brings in to question the rationale for such quality assurance programmes in relation to the expected cost-benefit.
2. **Inconvenience to patients.** It is usually necessary for patients to re-present for examination, at their own cost and inconvenience.
3. **Attitude of provider and evaluator.** The review of one's patients by a peer brings with it problems of acceptance of the method by both parties.

4. **Dentist-Patient relationship.** The question is raised of the effect of this type of peer review on the dentist-patient relationship.
5. **Validity of judgement.** Despite the use of well-established standards and criteria, retrospective evaluation does not take into account the circumstances existing at the time the original treatment was performed or other factors arising since treatment. Furthermore, the stages in the treatment process cannot be assessed, some of which might eventually have a bearing on outcome eg. cavity preparation.

De Jong and Dunning (1970) note that one advantage of direct observation of the performance of treatment is that it allows for a first hand appraisal of procedures at the time they are carried out. On the other hand, they acknowledge that it has major disadvantages. For this reason, De Jong and Dunning encouraged the record audit approach. In another criticism, Hillsman (1978) has pointed out that the large-scale use of direct examination of patients as a quality assurance mechanism is prohibitive from a cost and manpower point of view and its feasibility is also in doubt due to the difficulties involved in the determination of valid samples and uniform judgements. On the other hand, he states that the use of record reviews is much more feasible, more cost effective and is relatively well-accepted by the profession.

3.6 RECORD AUDIT

The medical record has long been utilised as the basis for clinical review and has been the prime focus ever since scientific methods of medical audit were developed (Lembcke 1956). The assumption is made that the quality of care rendered is reflected in entries made in these records. Payne (1979) has postulated that the treatment notes are useful repositories for information concerning clinical performance and, furthermore, if used for audit purposes, will have a beneficial effect on the standard of patient care. Chart audits are easy to conduct and can be broad or narrow in focus, that is one can concentrate on either the entire treatment or a single condition. While the emphasis in dentistry on technique rather than steps in diagnosis and patient management render the dental record more limited in this regard, quality reviews based on audits of dental records are nevertheless useful in many ways. The following areas might be assessed from the dental record or its accompanying radiographs and study models.

1. History taking

- (a) Thoroughness
- (b) Relevance

2. Medico-legal considerations

- (a) Consent
- (b) Recording detail
- (c) Patient awareness
- (d) Discharge summary

3. Diagnosis

- (a) Appropriate testing
- (b) Radiographs
- (c) Observations

4. Consultation and referral

- (a) Instance
- (b) Appropriate opinion source

5. Treatment planning

- (a) Sound basis
- (b) Appropriate to patient situation

6. Pre-operative care

- (a) Instructions given
- (b) Sedation
- (c) Antibiotic cover

7. Clinical management

- (a) Difficult to assess but some inference possible from record, study models, radiographs, laboratory prescriptions, clinical photographs.

8. Prescriptions

- (a) Drugs prescribed
- (b) Dosage
- (c) Prescription writing

9. Post-operative complications

- (a) Pain
- (b) Haemorrhage
- (c) Swelling
- (d) Infection

10. Treatment programme

- (a) Time allotted for appointments
- (b) Number of appointments
- (c) Productivity
- (d) Frequency of appointments

3.6.1 The Relationship Between Recorded Information and Clinical Performance.

In order for record audits to serve a useful purpose in quality assurance programmes, the validity of the assumption that the information in the record indicates the quality of care requires careful examination.

The relationship between recording performance and actual quality of care has been explored in a study conducted in Hawaii in 1968 (Lyons & Payne 1974). It was found that measures of good medical recording performance and good medical care performance are related. The relationship was not absolute but was found to be sufficient to support the hypothesis that medical recording and medical care performance go together. Record review was found to be a good

indicator of performance also in a study reported by McGuire, Hurley, Babbott and Butterworth in 1964. In an evaluation of a medical residency programme at the University of California, San Diego, 1977-79, the medical record was found to be a valid and objective method of measuring clinical performance (Ramsdell & Berry 1983). It was observed also to be a useful tool in promoting quality care.

On the other hand, Fessel and Van Brunt (1972) have disagreed that medical records accurately reflect the quality of care delivered, on the basis of their observations in appendicitis and acute myocardial infarction.

Long and Rogers (1975) have stated that a potential limitation of the use of medical records in the evaluation is the lack of recording of specific criteria in them even when the care rendered is above reproach. They concluded, after a study of Pennsylvania medical practices, that history and examination criteria could be determined with reasonable accuracy from inspection of records but treatment could not be evaluated due to frequent absence of recorded criteria.

In a study reported by Thompson and Osborne (1976) trained reviewers audited over 10,000 medical records in the offices of paediatricians and family physicians. Previously validated criteria were used in this review. Overall documentation of criteria was approximately 50% with measurements and laboratory data being frequently recorded and counselling items less frequently. The method of review was judged accurate and acceptable by physicians but only 50% said the results accurately portrayed their performance.

Although the patient record is thus reasonably accepted as a source of information for medical audit, its use for this purpose in dentistry is relatively recent. The first published material concerning the use of a dental record audit was reported by Friedman and Schoen (1972). The authors of this article describe a study of the quality of dental care in group practices in Los Angeles. The primary purpose of this study was to gain experience in utilising a quality assurance method which did not depend on direct examination of patients but rather employed the assessment of care from dental records and radiographs. A secondary purpose was to compare the quality of care rendered in the two practices. Findings included that the evaluation of the recording of the patient's examination provided no determinant of quality but that the determination of quality resided in the treatment recorded.

In a study of claims submitted to two major insurance companies, the quality of radiographs and their relevance to the decision making process for crown services was assessed. It was found that, while the standard of technical quality was adequate for most criteria, the quality, number and type of radiographs submitted did not explain much of the variation in disagreements between the direct examination and indirect (ie. radiographic) assessments for crown services (Bailit, Reisine, Downes & Richards 1979).

Another example of the estimation of the quality of care based partly on dental record audit was reported by Wolford, Morehead and Donaldson (1972). In this exercise, the quality of dental care in fifteen community health centres was evaluated using a combined

programme of record audits and personnel interviews.

The use of an audit of dental records is an important part of the quality assessment system developed by Demby and Rosenthal in 1978 and was demonstrated in an evaluation of the quality of care in the Lutheran Medical Center, Brooklyn N.Y., Department of Dentistry in 1979 and 1980 (Heaney & Demby 1983).

Lindahl and others (American Fund for Dental Health 1983a) compared a record review with results of clinical assessment. They found that there appeared to be very little correlation between the quality of record keeping and the quality of restorative care.

Record reviews have been conducted at the Westmead Hospital Dental Clinical School over the past six years and have provided a useful instrument for assessing the quality of care. These audits are undertaken using explicit criteria in order to identify possible deficiencies in patient management. Analysis of history taking, for example, is undertaken by clerical staff using a check-list to identify those medical conditions which should be listed in the recorded history. (At Westmead, it has been the policy to record each question either in the negative eg. Rheumatic Fever^o or positive eg. Rheumatic Fever⁺ and then amplify this history as appropriate. More recently a printed prompt sticker listing the more important medical history reconsiderations has been utilised. Either system is particularly useful when a record audit is undertaken.) Other audits, using the dental record, have been most useful in isolating those cases which might be suitable for closer scrutiny.

The adequacy of documented information is important if the patient's record is to serve as a tool for assessment of the quality of care. Jerge and Orlowski (1985) have outlined the relationships between information recorded and its use in review of care. Figure 2 shows this relationship diagrammatically.

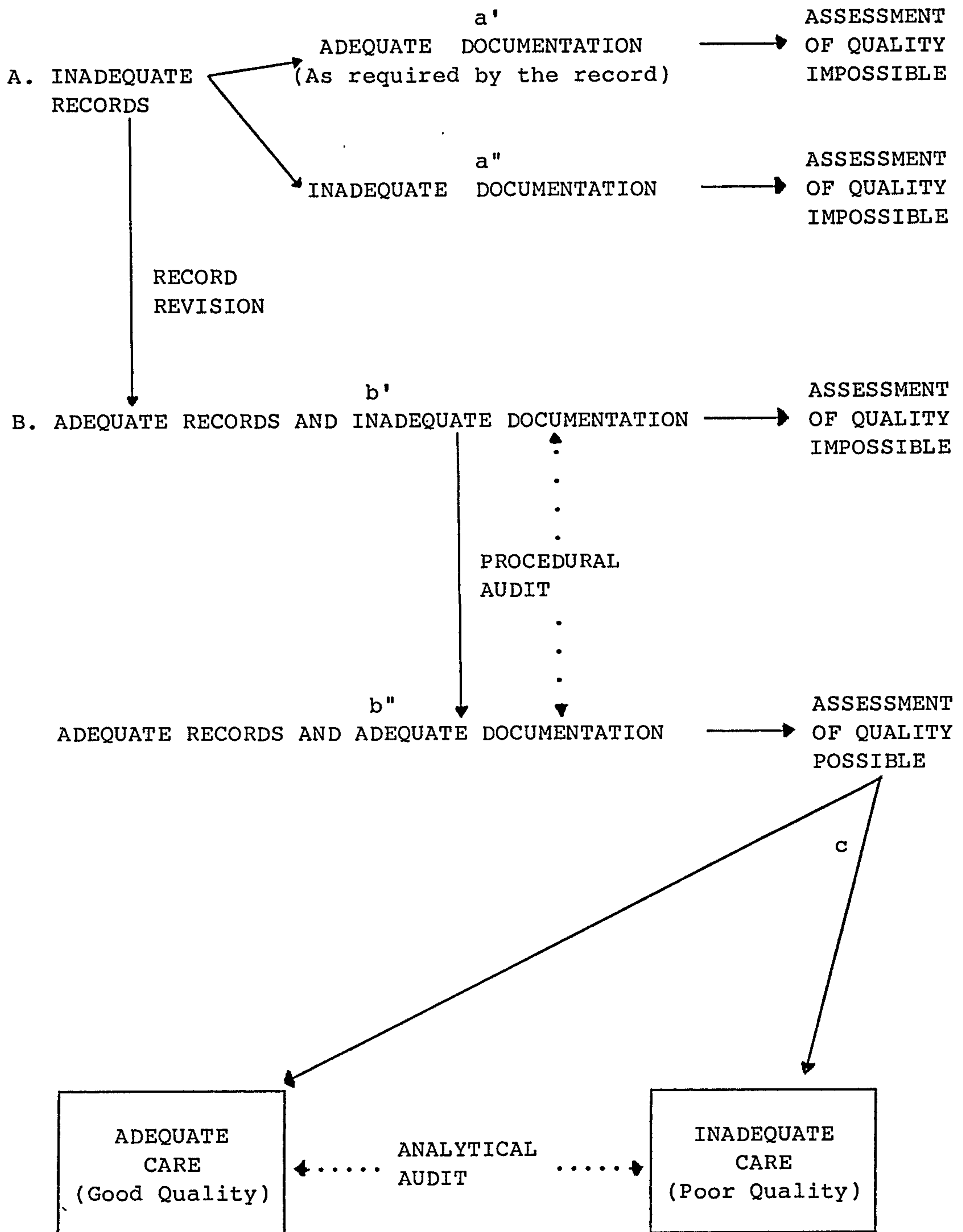
3.6.2 Elements of a Record Audit

Calhoun (1973) described the essential elements of a record-keeping system which allows for scientific and objective evaluation of dentist performance and the assessment of quality of patient care based on problem-oriented health record. He discusses the application to the oral surgeon of the Weed Problem-Oriented Medical Record System which is as follows.

1. Establishment of data base
 - (a) Chief complaint
 - (b) Statement of current illness
 - (c) Past history and systems review
 - (d) Physical examination
 - (e) Base line laboratory data
2. Formulation of all problems (list)
 - (a) Diagnosis
 - (b) Physiological findings
 - (c) Symptoms
 - (d) Abnormal laboratory findings

Figure 2 The relationships between the adequacy of documentation and the adequacy of patient care.

Source: Jerge & Orlowski (1985) p486



3. Plans for each problem

- (a) Collection of further data
- (b) Plans for treatment with specific procedures or drugs
- (c) Plans for educating the patient about his illness and his part in managing it

4. Follow-up on each problem - progress notes

- discharge summary.

In an extension of the record review system developed for medical care by the Drew Post-graduate Medical School in Los Angeles, a model for enabling dental practitioners to identify problems in care, institute changes and evaluate the effectiveness of these changes, was developed (Marcus, Koch & Gershen 1979). This system revolves around the interaction between two concepts - the stages of care and the distribution of services. The four stages of care are defined as non-use, episodic or emergency use, initial care and maintenance care. Nine categories of distribution of services are listed: diagnosis, prevention, operative treatment, crown and bridge, removable prosthetics, oral surgery, endodontics, periodontics, and others. The use of categories rather than individual treatment services facilitates recording of data and enables the results to be easily interpreted. In the review, the recurring patterns of patient interaction over a period of time are analysed in order to evaluate the practice service mix eg. one might question the effectiveness of initial treatment if a patient in the maintenance phases receives surgery etc.

3.7 SELF ASSESSMENT

Self assessment is an integral part of the practice of any profession and, to some degree or another, all dentists carry out this exercise in their professional practice, albeit informally. Self evaluation may involve decision making, the formation of value judgements and the recognition of standard performance criteria or, indeed, development of same. The importance of the opportunity for the dentist to exercise this skill has been recognised with the introduction of self assessment training into some U.S. undergraduate curricula and the stimulation for research into the worth of self evaluation.

Nelson (1971) has described self-assessment as "the first step in peer review" and points out the responsibility of the professional to ensure satisfactory standards in clinical practice. He maintains that following self-review the clinician is then able to join others motivated the same way in establishing the confidence of the public in the profession.

3.7.1 Self Assessment by Students

Senior dental students from the University of the Pacific, School of Dentistry, in San Francisco participated in an experiment which compared their own evaluations of their performance with those carried out by their tutors (Ries, Kreit & Podshadley 1971). It was found that students' self evaluations were higher than both the students' predictions of teacher evaluations and the actual

evaluations themselves. There was no relationship between student and teacher evaluations.

In order to overcome the traditional reluctance of dentists to submit to peer review, the University of Kentucky incorporated a review exercise in a second year pre-clinical prosthodontics course (Brehm 1972). As a group it was found that the students were more critical and candid than faculty members and the better-performing students were more critical in self assessment and more realistic in the assessment of the others than were poorer-performing students. It was also found that there was more agreement between students on either excellent or very poor performance than their was on average performance.

In the United Kingdom, at the University of Edinburgh, training in self assessment by students in a dental technology course was undertaken in an effort to introduce greater instructional value by discussion of the criteria used in assessment and the reasons for the achievement of particular gradings - the students assessing their own work prior to its being graded by the supervisor (Geissler 1973). It was found in this study that student ability in self assessment improved with experience and apparent gain in confidence. The self assessment exercise appeared to have a beneficial outcome on performance.

The Department of Pediatric Dentistry, University of the Pacific, modified its technique course in 1973 to include training in self evaluation using a clearly defined set of criteria (Abrams & Kelley

1974). It was found that the students ultimately mastered the skills of self assessment very well and it was believed that this led to an improvement in technical performance, the latter not only confirming earlier work (Geissler 1973) but being reinforced by studies reported by Mast and Bethart (1978) at the University of Kentucky. The latter research also showed an extremely high rate of correlation between evaluations of restorations by senior dental students with the assessments made by their instructors. The beneficial effect on student performance of self assessment reported in the studies of Geissler (1973), Abrams and Kelly (1974) and Mast and Bethart (1978) is not endorsed in a study by Gershen and Jedrychowski (1979). They found that in a pre-clinical pedodontic course there was no difference between the levels of performance achieved with traditional instructor evaluation compared with those achieved with student self evaluation. Additionally, Ries, Kreit and Podshadley (1971) found that while self evaluation might be therapeutic for the student, the method has doubtful reliability, as most students have a tendency to evaluate themselves higher than do their instructors. On the other hand, one study found that junior medical students tended to rate themselves lower than the estimates given by their peers, the latter grades correlating better with faculty assessments (Linn, Arostegui & Zeppa 1975).

In Project ACORDE (A Consortium On Restorative Dentistry Education), a cooperative effort in the U.S.A. to standardise pre-clinical dental teaching, students were given the opportunity to use developed criteria in forming an assessment of their own performances (MacIntyre 1977). It was found here that the students' evaluations of

themselves were very close to the assessments made by faculty tutors.

In other studies, 90% of students at the University of Michigan, where a programme of training in peer review and quality assessment of complete dentures is conducted, agreed that the programme improved their ability to evaluate their own work (Novetsky & Razzoog 1981) and students' self assessments are important features of pre-clinical restorative dentistry training at the Medical College of Georgia (Edwards, Morse & Mitchell 1982) and the Ohio State University (Pagniano, Kunovich & Rashid 1987).

Denehy and Fuller (1974) review research which showed better agreement between peer evaluation and instructor evaluation (80%) than between peer evaluation and self evaluation (70%). Agreement between self evaluation and instructor evaluation was even lower (60%). In a study reported by them they found quite good correlation between the results of student self evaluation and those of their instructors although somewhat less than the ideal. Part of this discrepancy was explained by evidence of failure of the students to comprehend several important concepts in one of the practical examinations. There was no evidence, however, to support the assertion by Reis et al in 1971 that students over-evaluate themselves and, in fact, the reverse was often true. Denehy and Fuller also claimed evidence of higher correlation between student and instructor groups when the student group comprised better students than when it contained students of poorer ability.

A report by Forehand, Vann and Shugars (1982) casts some doubts upon

the belief that there is a positive correlation between the performance ability of students and their ability to accurately assess the standard of their own work but acknowledge that there is a paucity of research to back up this premise.

Shrauger and Terbovic (1976) have shown that high self-esteem subjects perceived themselves as doing better on a task than low self-esteem subjects, although performance of the two groups was actually comparable. The two groups' evaluations did not differ when they were assessing others. Warren (1976) in a similar study confirmed these findings, although she did find this phenomenon to be confined to the male students, female student evaluations not showing these discrepancies.

3.7.2 The Correlation Between Self Assessment and Student Performance

The aforementioned work by Forehand et al reports a study by Murstein which indicated that high performing students were generally better evaluators. Murstein speculated that students used the grade received in previous examinations as the basis for their assessment and that the poorer-performing students were grossly unrealistic in their expectations of their grading and relatively unaffected by their past achievements. This is supported by Brehm (1972) and Denehy and Fuller (1974). The inability of the poorer-performing students to assess their own efforts realistically was also noted in a study of a sophomore orthodontics course (Jacobs, Briggs & Whitney 1975).

Thus, a review of the literature would seem to indicate that student

self-assessment might be able to play a useful part in the learning process and act as a source of training for graduate quality assessment activities. It would also seem that the ability of a student to accurately assess his or her own work was dependent to some degree on the performance level of the student. Forehand and colleagues sought to examine the relationship between student self evaluation and performance in a preclinical laboratory examination. The results are somewhat interesting in that they demonstrate no relationship between performance and the ability to self assess. Rather they indicate that students with higher grades are significantly better predictors of their performance, much as was found in the work of Murstein, Brehm and Denehy and Fuller. Forehand et al found that all students recognised good performance but were poor evaluators of incorrect criteria and more often than not failed to recognise mistakes. This may explain why the poor performing student showed apparent deficiencies in his or her ability to self assess in previously published work and it questions the widely held premise that the ability of the better student to predict grades is as a result of their apparently better aptitude in self assessment.

3.7.3 Self Assessment by Graduates

Other examples of the use of self assessment as an educational measure have been seen in programmes conducted by professional bodies. The American Association of Oral Surgeons developed a 500 question text designed for self evaluation of oral surgeons, to be used on a voluntary basis (Anonymous 1972), the Royal College of Physicians uses self assessment (Corke 1984) and there are several

examples of this approach by professional associations in Australia. The Royal Australian College of Physicians has employed similar programmes for some years and a self assessment exercise was demonstrated by the Royal Australasian College of Dental Surgeons at the 1985 Australian Dental Congress.

The use of self assessment obviates the practical disadvantages of direct peer review and may well be the key to efficient voluntary quality assurance programmes in the private practice situation. In an experimental study in Washington State, self assessment of restorative care in 102 dental practices was compared with the results of assessments by trained examiners (Milgrom, Weinstein, Ratener & Morrison 1978a). Analysis showed that self assessments were significantly more critical than peer review when evaluating factors affecting the service lifetime of restorations, while differences between the two methods of assessment were greater for cast restorations. On the whole, this study showed self assessment to be a useful method of evaluating the quality of dental care. The same group found in another study (Milgrom, Weinstein, Read, Morrison & Ratener 1977; Milgrom, Weinstein, Ratener, Read & Morrison 1978b) comparing the results of self assessment with the evaluations of trained examiners, that the employment of specific rating criteria strengthened the relationship between self assessment and actual treatment quality. They found also that both experienced and less-experienced practitioners produced accurate self assessments, with the more experienced practitioners tending to rate themselves, generally, more modestly. More importantly, Milgrom and his colleagues found that dentists who participated in a self assessment

programme improved their performance as a result (Milgrom, Weinstein & Ratener 1980). Milgrom and others reported on the demonstration of a quality assurance programme developed for a predominantly rural state (Montana) which relied on the use of self-assessment (American Fund for Dental Health 1983a).

A practical programme of quality assurance, dependent on self assessment, has been described by Perkins (1982). He reports the employment of a number of self evaluatory exercises, based on mutually drawn-up criteria, conducted by 19 dental officers in the community service in North West London, U.K. The essence of this exercise was the exchange of ideas in group discussion following the individual evaluations. The experiment which concentrated on three aspects of care - the Class II amalgam restoration, the management of the nervous patient and the acid-etch composite resin restoration of incisal edge fractures - was very well received by the participants and was thought to have had a positive effect on the quality of care.

Self assessment as a quality assurance mechanism avoids the high cost, threatening nature of direct peer review and does not interfere with the dentist-patient relationship. It does not inconvenience patients with additional examinations and can be applied easily to any aspect of dental practice. It does, however, bring some possible disadvantages. Abramowitz and Mecklenberg (1972) have discussed some of these. They point out the natural tendency for one to justify one's own actions which might well destroy objectivity and severely limit one's efficacy in self evaluation. It is also possible that the dentist may be unaware of deficiencies in performance and be ignorant

of failings in certain procedures. It is for these reasons that the Indian Health Service programme of quality of care monitoring does not rely on the use of self evaluation.

3.8 CRITERIA AUDIT

The most significant advance in the development of methods for reviewing the quality of patient care came with the introduction of the criteria audit. This is a technique for measuring the quality of care rendered against a set of predetermined criteria with the aim of attaining an acceptable standard. Lembcke (1956) introduced this concept as a scientific method of medical auditing and it was developed further in the U.S.A. within the Joint Commission on Accreditation of Hospitals. Lembcke describes the main features of this type of audit as:

1. arranging data into meaningful classifications eg. classifying major female pelvic surgery according to whether it may result in sterility or castration;
2. verifying the statements in the clinical record by means of written confirmation eg. pathology reports, radiographs, written reports;
3. establishing the accuracy of tissue diagnosis, radiographs and laboratory tests by submitting representative samples for independent review;
4. comparing the verifiable facts with established criteria; and
5. comparing the degree of compliance with these criteria with a standard degree of compliance found to be characteristic of

hospitals of acknowledged merit.

3.8.1 Applications of Criteria Auditing

Subsequent applications of the technique of criteria audit have been refined to make use of the ease of review against explicit criteria to enable the utilisation of non-medically qualified staff in carrying out much of the time-consuming audit process. While a medical staff committee chooses the subject, determines the study objectives and sets criteria, the actual audit of medical records is carried out by clerical staff. Records at variance with the established criteria are then referred to the review committee for examination, problem identification and appropriate action. This retrospective audit, following on from the work of Lembcke, has become the basis for cost-effective review of patient care using treatment records and eliminating the need for patient recall or direct clinical examination.

In the 1960s, a new approach was tested as a method for evaluating care for patients with urinary tract infections (Gonnella, Goran, Williamson & Cotsonas 1970). Prior to this quality assessments had generally consisted of either direct observation of care, record reviews or comparisons between treated and untreated groups. One important weakness in previous reviews was the lack of objective information about the health status of the patient populations studied. This investigation by Gonnella et al was conducted in three phases.

1. An unselected serial sample of patients with possible pyelonephritis was studied prior to being treated by regular clinical staff.
2. Clinical records were analysed for diagnosis and therapeutic procedures and compared with the findings of the preliminary study.
3. Objective examinations were given to the members of the clinic teams in order to compare their knowledge of urinary tract infections with their actual performance.

It was found that while 108 patients were found in the initial screening to have significant bacilluria, only 68 had significant history information recorded by the clinic teams with only 31 of these being investigated further for urinary tract infection. It was also found that there was no correlation between performance in the objective examination and performance in actual patient care, although the examinations did reveal areas of deficiency in knowledge which required correction. The disturbing feature was that clinicians exhibiting the required knowledge frequently failed to put this into practice when treating patients.

Criteria auditing was used to review the treatment of carcinoma of the cervix in a large Sydney teaching hospital (Horvath, Houghton, Ledgerwood & Adreson 1981). Criteria used were developed by the participating gynaecologists and included:

1. appropriate diagnostic work up;
2. length of stay;
3. treatment; and
4. complications.

Records were reviewed by a medical records officer for 47 patients with histologically proven cervical carcinoma during a twelve month period. Records which failed to meet the criteria were reviewed by a gynaecologist and results presented to the monthly mortality/morbidity meeting of the Division of Obstetrics and Gynaecology. The audit was considered to be highly successful in reviewing management of this condition and a number of important conclusions were drawn from the study. As a consequence, treatment variability has been reduced and overall quality of care improved.

An outgrowth of the audit system was that Williamson, Alexander and Miller (1967) demonstrated that record audits could be used to identify specific educational needs which could be addressed in continuing education and Brown and Fleisher (1971) further developed Williamson's work into the "bi-cycle model". In this system, problems or deficiencies identified by clinical audits are converted into direct action or, most commonly, by continuing medical education.

An evaluation of the quality of dental care in two group practices in Los Angeles was undertaken by Friedman and Schoen (1972). This audit was one of the earliest reported dental care assessments which did not rely on direct examinations of patients, using instead a review of radiographs and dental records. It served also as a pilot study to

evaluate and develop data which could be used in future assessments. The method relied on the employment of specific criteria and some of the findings indicated that:

1. the evaluation of the recorded patient examination provided no determinant of quality;
2. the determination of quality lies rather in the assessment of treatment recorded and the general evaluation of the practice;
3. that the pattern of dental care can be assessed by an analysis of a single series of treatments, preferably the first one; and
4. that the interval of time between each series of appointments differed markedly in the two groups studied, but the changes in the natural dentition as the end-results did not differ significantly.

Radiographs are a useful source for the auditing of dental care. Friedman (1977d) estimated that 75% of dental needs can be diagnosed from dental radiographs which provides a good basis, then, for being able to utilise the patient's dental records in evaluating diagnosis and treatment planning. The availability of study models is also invaluable in reviewing these aspects in the quality of patient care. An efficient system for reviewing radiographs was developed during 1973-74 using specific evaluative criteria. It was suggested that this system could be satisfactorily carried out by trained auxiliary personnel (Beideman, Johnson & Alcox 1976).

Apart from the earlier work of Friedman and Schoen, others have applied the techniques of criteria auditing to dental care. Wasserman (1979) describes such a system for use in a dental teaching hospital. In another exercise, which utilises the services of auxiliaries in a quality assurance study of dental radiology, a low-cost, simple yet effective evaluation programme, suitable for use in private practice, is described (Valachovic, Reiskin & Kirchhof 1981). This programme provides a basis for systematic measurement of various parameters which affect the quality and production of the radiograph. Tests designed to establish the adequacy of specific functions are described together with the reasons for poor image quality. It is suggested that the use of this programme can result in reduced costs, improved radiation hygiene and improved diagnosis.

3.8.2 Criteria Mapping

The use of explicit criteria in auditing the quality of care provides objectivity and reliability and permits delegation of the bulk of the auditing task to sub-professionals. However, the inherent lack of flexibility in using criteria lists prevents the audit from dealing with some key aspects of patient care as it fails to make allowance for individual patient characteristics which might lead to variation in patient management. While some criteria-list-based methods of assessment are better than others in coping with this patient variation by restricting audits to specific sub groups, this inherent weakness remains one of the major disadvantages of this type of auditing. Other disadvantages of criteria lists are that the

longitudinal or progressive nature of care and the decision-making process of the provider are not generally reflected in this type of review.

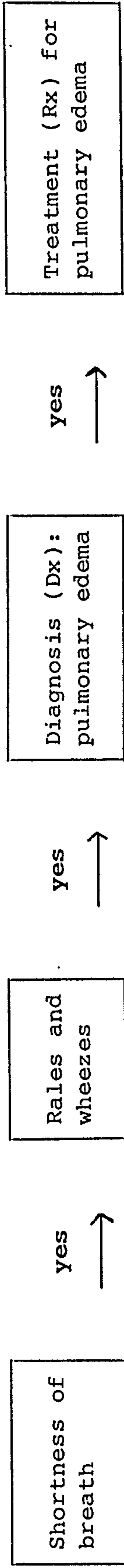
Criteria mapping has been proposed, then, as a solution to the above difficulties (Kaplan & Greenfield 1978). This system tracks the logic and decision-making activity of the health care provider and Figure 3 shows patient-specific criteria maps for the sequence of care and decision making.

These authors maintain that, although criteria-mapping might appear to be rather involved, it is neither more complicated nor more detailed than a criteria list. It allows for patient specificity, is flexible, and generally has fewer items for abstraction than the standard criteria list. Later studies (Greenfield, Cretin, Worthman, Dorey, Solomon & Goldberg 1981) provide evidence that criteria mapping is superior to the conventional criteria listing in predicting health outcomes from process level audits. The criteria map allows the reviewer to follow the diagnostic and treatment process for the individual case and permits analysis of the clinician's decision making process. A good example of the use of a literature review to construct a list of criteria which is then converted into a criteria map is illustrated in Table 19 and Figure 4 relating to the treatment of an avulsed tooth, taken from the work of Gotowka, Bailit and Ellis (1982).

Figure 3. Excerpts from criteria map to evaluate care of patients with chest pain. A: branch used to assess care of 77-year-old woman presenting with shortness of breath. The patient had a history of myocardial infarction and recent pulmonary edema. Physical examination revealed rales and wheezes and suggested a diagnosis of pulmonary edema. Management was appropriate to this diagnosis. B: branch used to evaluate care of 31-year-old man who had had persistent chest pain since a fall five days earlier. Concomitant rib tenderness indicated contusion, and treatment was with heat and rest.

Source: Kaplan & Greenfield (1978) p5

A



B

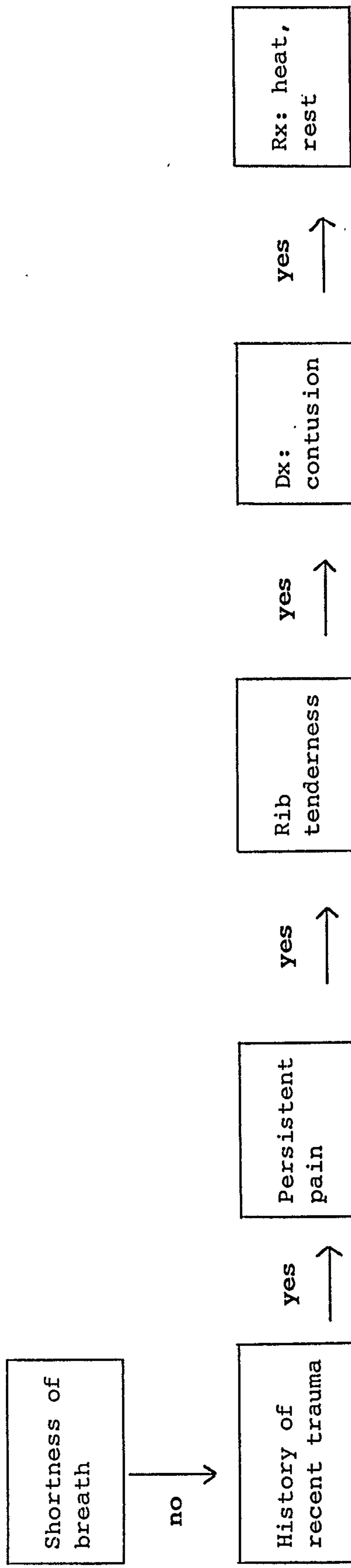


Table 19 Literature review for the audit topic "Treatment of an Avulsed Anterior Tooth" (page 1 of 2)

Source: Gotowka, Bailit & Ellis (1982) p129

Criterion 1

Is avulsed tooth presented within 30 minutes?

Andreason and Hjorting-Hansen have shown that 30 minutes appears to approach the limit where viable elements of the pulp and periodontal tissues can be maintained².

Criterion 2

Did patient replant tooth within 30 minutes?

Heithersay¹ believes that it is preferable for the patient to replant the tooth immediately following washing with water to minimize the extraoral period.

Criterion 3

Does dentist decide to leave tooth out?

Heithersay¹ cautions that replantation of an avulsed tooth is not always the preferred treatment. In cases of severe crowding requiring orthodontic treatment or where extensive alveolar bone damage has occurred, replantation may not be indicated.

Criterion 4

Replace avulsed tooth back into socket.

Heithersay¹ recommends the irrigation of the socket with warm saline solution to remove blood and debris. The tooth itself is then gently washed with warm saline solution before replantation. Loe and Waerhaug³ recommend caution to ensure as little damage to attached periodontal fibers as possible.

Criterion 5

Splint tooth in position.

A splint is used to fix the avulsed tooth in its proper position relative to its neighbours. The method of splinting is not critical. Heithersay recommends that the tooth remain splinted for three to four weeks.¹

Criterion 6

Take radiographs.

Morse⁴ recommends that a periapical radiograph be taken to verify that the tooth is properly repositioned.

Criterion 7

Does the patient have a condition requiring antibiotics?

Criterion 8

Prescribe antibiotics.

Appropriate antibiotic therapy should be prescribed for patients determined to be at risk. Antitetanus prophylaxis as well as antibiotics are indicated if the avulsed tooth contacted soil.¹

Criterion 9

Confine the patient to a soft diet for one week.

Ingle⁵ recommends a soft diet for at least one week to avoid traumatization of the splinted tooth.

Table 19 (page 2 of 2)

Criterion 10

Reappoint patient for endodontic evaluation and checkup.

Heithersay¹ suggests regular radiographic examinations for one year following replantation. The tooth should be evaluated for periapical involvement and appropriate endodontic therapy should be initiated if evidence of pulpal necrosis is discovered.

Criterion 11

Is apex formed?

In teeth with an incompletely developed apex, there is a good chance for the reestablishment of viable tissue within the root canal (provided the tooth was replanted within two hours).¹

Criterion 12

Perform endodontic therapy.

In teeth with complete root formation, there is relatively little chance of reestablishing viable pulpal elements and the usual long-term result will be necrosis of the pulp and bacterial invasion. Heithersay recommends that endodontic therapy be initiated within ten days if the splint allows access to the tooth.¹

Criterion 13

End audit.

Criterion 14

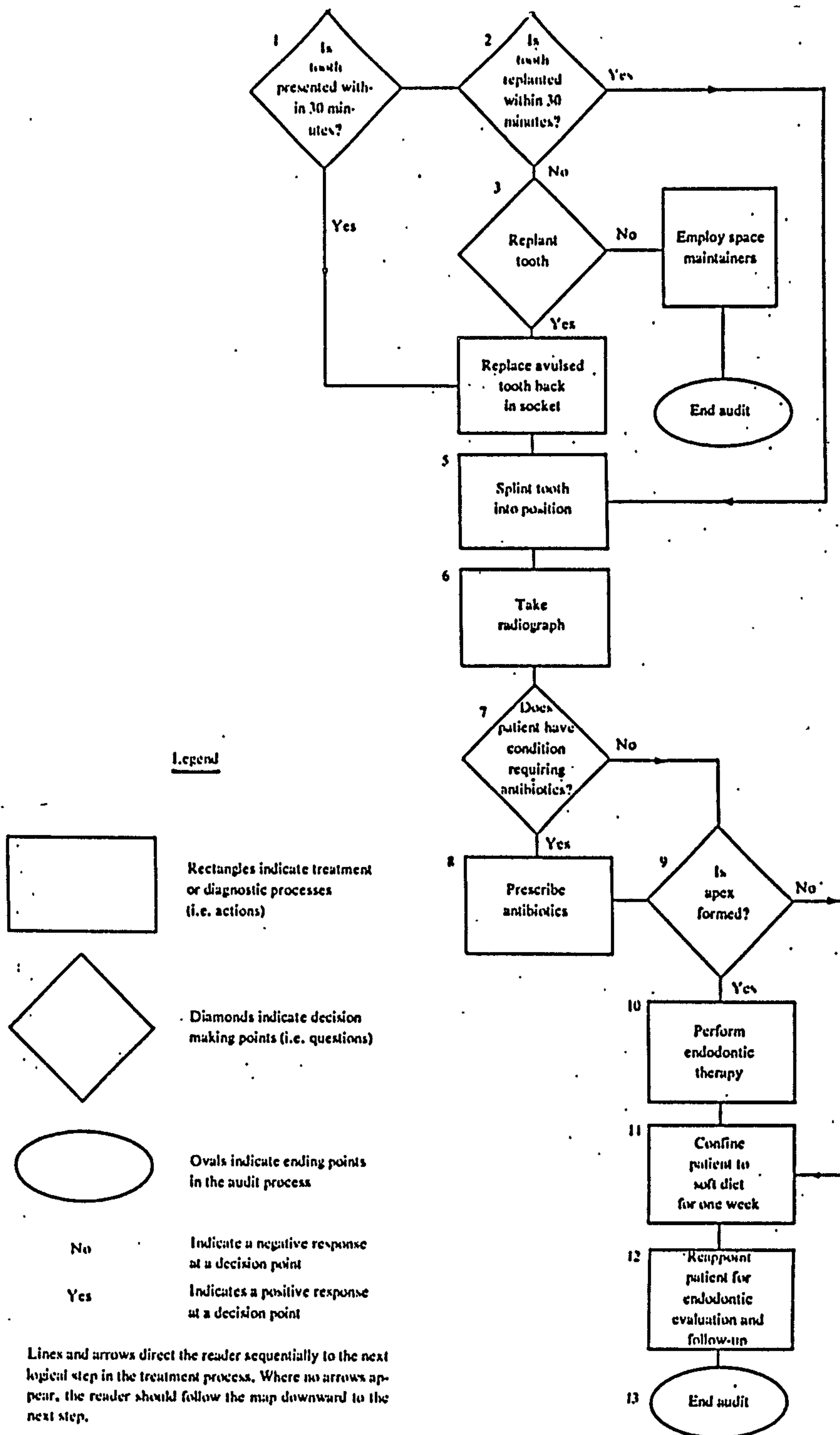
Space maintenance should be employed in the following situations.^{7,8}

Loss of anterior tooth in a very young child or a child with crowded primary dentition; loss of multiple adjacent teeth.

1. Heithersay, G. Replantation of avulsed teeth. Austral Dent J 20:63, 1975.
2. Andreason, J., and Hjorting-Hansen, F. Replantation of teeth: radiographic and clinical study of 110 human teeth replanted after accidental loss. Acta Odontol Scand 24:263, 1966.
3. Loe, H., and Waerhaug, J. Experimental replantation of teeth in dogs and monkeys. Arch Oral Biol 3(4):176, 1961.
4. Morse, D.R. Clin Endodont, Springfield, Ill. Charles C. Thomas, 1973.
5. Ingle, J. Endodontics. Philadelphia. Lea & Febiger, 1976.
6. Zachrisson, B., and Jacobson, I. Long term prognosis of 66 permanent anterior teeth with root fracture. Scand J Dent Res 83(6):345-54, 1975.
7. McDonald, R., and Avery, D. Dentistry for the child and adolescent. St. Louis, C.V. Mosby Co., 1978.
8. Finn, S., ed. Preventive orthodontics and clinical periodontics. Philadelphia, W.B. Saunders Co., 1973.

Figure 4 Treatment of an avulsed tooth - criteria map

Source: Gotowka, Bailit & Ellis (1982) p130



The "Guidelines for the Development of a Quality Assurance Audit System for Hospital Dental Programs", published by the American Dental Association (1983d), was developed by the same group at the University of Connecticut School of Dental Medicine under a grant from the American Fund for Dental Health in the W.K. Kellogg Foundation. In addition to the example described in Figure 4, sample criteria lists and maps are provided in this publication for:-

1. treatment of a fracture to a permanent anterior tooth;
2. treatment for acute necrotising ulcerative gingivitis;
3. use of multiple fluoride therapy;
4. treatment of pericoronitis;
5. management of periodontal and periapical abscesses and facial cellulitis; and
6. follow-up of referrals to the dental clinic from the emergency room.

One feature of this publication is the provision of instructions for data retrieval which allow for the use of auxiliaries or clerical staff in the audit process. Table 20 shows the type of criteria used with Figure 5 showing the same criteria displayed in map format.

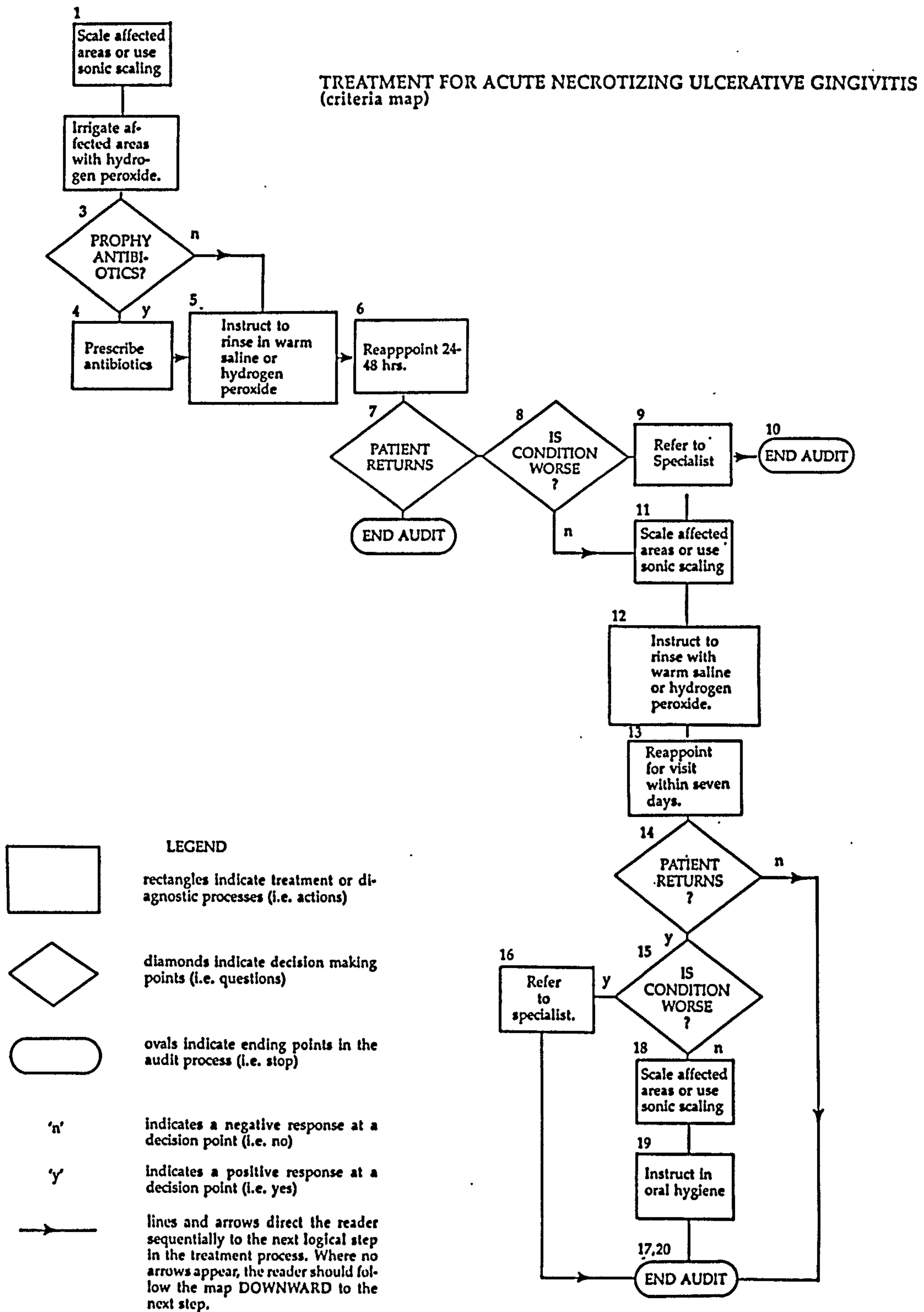
Table 20 Criteria List - Acute Necrotizing Ulcerative Gingivitis

Source: American Dental Association (1983d)

CRT. #	DEC.	CRITERIA AND DECISIONS	INSTRUCTIONS FOR DATA RETRIEVAL
1		Scale affected areas	Look for an indication of scaling, scaling with root planing, or sonic scaling.
2		Irrigate affected areas with H ₂ O ₂	Look for an indication of an irrigation, flushing or rinsing with H ₂ O ₂ (hydrogen peroxide).
3	•	DOES PATIENT HAVE A CONDITION REQUIRING USE OF ANTIBIOTICS?	Look for information in the medical history form and determine if the patient has any of the following systemic or localized conditions: rheumatic heart disease, valvular prostheses, uncontrolled diabetes, severe alcoholism, cancer patients undergoing chemotherapy, gross necrosis of papillae, severe pain, fever, cervical lymphadenopathy.
4		Prescribe antibiotics	Look for the terms erythromycin, penicillin, tetracycline, clindamycin, if other medication is prescribed, make a note of the medication.
5		Instruct patient to rinse mouth with warm saline or hydrogen peroxide.	Look for an indication that the patient was given instructions on the techniques of home mouth rinses and a schedule to follow in using the rinses.
6		Reappoint patient for visit 24-48 hours or refer to private dentist.	Look in the progress notes section, an appointment section, or simply a note regarding reappointment or referral in the treatment notes.
7	•	DOES PATIENT RETURN?	Look for any continuation of the treatment, a note indicating cancelled appointments, or some other indication of referral, continuation, or termination.
8	•	HAS CONDITION WORSENE?	Look for an indication of deterioration of the condition. This "worsening" could be in terms of swelling, pain, bleeding, inflammation, or infection. If there is no information concerning the oral condition and the patient was treated on this return visit, proceed to criterion #11 and make a note.
9		Refer to specialist	Look for a referral to another provider or facility.
10		END AUDIT	
11		Scale affected areas	See instructions for criterion #1
12		Instruct patient to rinse mouth with warm saline or peroxide.	See instructions for criterion #5.
13		Reappoint patient for visit within 7 days	See instructions for criterion #6.
14	•	DOES PATIENT RETURN?	See instructions for criterion #7.
15	•	HAS CONDITION WORSENE?	See instructions for criterion #8. If there is no information in the record and the patient was treated on this return visit, proceed to criterion #18 and make a note.
16		Refer to specialist	See instructions for criterion #9.
17		END AUDIT	
18		Scale affected areas	See instructions for criterion #1.
19		Instruct patient to rinse mouth with warm saline or peroxide.	See instructions for criterion #5.
20		END AUDIT	

Figure 5 Treatment for acute necrotizing ulcerative gingivitis (criteria map)

Source: American Dental Association (1983d) p53



3.9 UTILISATION REVIEW

Utilisation reviews are measurements of the frequency of occurrence of a particular service, treatment process or modality. They grew out of retrospective analyses of insurance claims for medical care in the U.S.A. and their use became common in the 1960s (Legge 1981). Assessment of the frequency of provision of a particular service is favoured by organisations which fund health care, such as governments or health insurance companies, as a means of monitoring and controlling costs. However, this approach is very useful in any analysis of the appropriateness of health care and is accepted as an established quality assurance method. The encouragement of the funding bodies in pursuit of utilisation reviews, albeit for their own purpose of economic monitoring, has promoted this method of quality assurance. Like criteria auditing, the actual collection of data relating to the rate of provision of services can be delegated to non-clinical personnel.

In order to assess what rate of utilisation of a service represents sound health care, one must be recognisant of the benefits arising from such utilisation, the cost, the existence of reasonable alternatives and the limitations of resources. Friedman (1985) points out that the goal of every dental programme is the achievement of high utilisation, whether in private practice or public health schemes. The ideal of 100% utilisation he considers to be unrealistic.

As the utilisation of dental care often has been inversely correlated

with family income levels, a study was conducted to measure patterns of use among different social groups in a population which was entitled to dental care at little or no cost (Nikias 1968). This study indicated that elimination of the cost barrier did not ensure optimum utilisation of dental services and there were significant differences between groups of different occupational status, white-collar workers being more likely to seek dental care. Weaver and Milgrom (1987) found that dental insurance did not increase dental attendance among the elderly although the mix of services sought was affected. There are factors other than cost which may influence the demand for dental care. Murray and Wiese (1975) studied the utilisation trends of the population served by a neighbourhood health centre in Kentucky in 1973 and found a strong correlation between attendance and satisfaction with dental treatment. In research carried out into utilisation patterns for over 200 general dentists it was found that there were significant differences between practices even when patients were of the same age group, had the same dental insurance cover, were of the same socio-economic class and had been eligible to receive services for about the same time. The study showed that the treatment preferences of the provider were the predominant influence in establishing treatment patterns (Stern 1980).

A simple example of the use of a utilisation review to assess and improve the quality of care can be seen from a report by King and Suthers (1981) relating to a quality assurance exercise conducted in a Melbourne suburban district hospital. The frequency of creatinine phosphokinase estimations carried out in the coronary care unit was

measured. Reduction of the frequency of this test from three times to twice per day was found to have no adverse effect on health outcomes. This study showed that a simple review of this nature could lead to improvements in the efficient allocation of finite resources and the use of same in accordance with the principles of optimal health care.

In a study, completed in 1951, in hospitals in Hartford, Connecticut, a utilisation review was conducted to examine the rate of inpatient admissions for a number of conditions including surgical removal of teeth. Specific anaesthesia and patient medical criteria which justified treatment as an inpatient were used and, if cases did not meet these criteria, they were referred to the hospital's utilisation review committee for review by surgeons/dentists. These reviewers found that 451 (30.8%) procedures from a total of 1465 cases could have been performed in an ambulatory setting. The proportion of patients admitted for surgical tooth extraction who could have had ambulatory surgery was even higher - 106 cases, or 42.7% of the 248 cases in the study. The results were communicated to the hospitals involved. Actions taken by them varied from expansion of ambulatory surgery facilities/operating time, administrative changes such as changes in policy, or discussions at meetings held to consider these findings. In a restudy in early 1982, it was found that there was a decrease in admissions for surgery and an increase in ambulatory surgery, resulting in decreased costs and an increase in available beds for patients needing inpatient care. This study illustrates the use of utilisation review to improve the quality of care by altering behaviour of practitioners in adopting more appropriate treatment modalities (Wright, Goldberg, Mark, Petrillo & Wiesel 1983).

The length of time amalgam restorations last before replacement was investigated for use as an intermediate outcome measure in utilisation reviews and quality assurance studies. Based on record data from 37 dental practices, it was found that after two years, approximately 13% of the amalgams were replaced and the estimated median lifetime for these restorations was 10-14 years. The variation in replacement rates among practices was substantial but was not explained by the technical quality of the restorations. It was found that there was a tendency for dentists with a perceived need for more patients to have higher replacement rates. There was also some correlation between replacement rates, increased patient visits, older practitioners and higher patient incomes (Bailit, Chiriboga, Grasso, Damuth & Willemain 1979).

In another example of a utilisation review, students at the Medical College of Ohio performed retrospective reviews of their peers' laboratory usage patterns (Garg, Gliebe & Kleinberg 1979). Data covering the patient's history, physical examination, problem list and treatment plan had been completed by students during internal medicine and paediatric rotations. This information, along with the first day's diagnostic orders, was provided to community medicine students who then evaluated the cost and medical necessity of diagnostic tests ordered in light of the problem information. It is suggested that this study conducted at student level might influence the participants to be more conscious of avoiding costly and inappropriate laboratory investigations in their future practice.

Several investigators have suggested that the efficiency of utilisation review systems might be improved if reviews were targeted on providers who have questionable practice patterns (Costello, Markland & Mahan 1981; Horn, Roveti & Kreitzer 1980; Hunter 1980; Egdahl 1981). The assumption is made that practitioners with unusually high utilisation rates for particular services are likely to be guilty of overtreatment. Bailit and Clive (American Fund for Dental Health 1983a) describe some research, carried out as part of the National Quality Assurance Program, to assess the types of treatment received by patients and the corresponding chronological changes in their oral health, as a measure of the appropriateness of care. In the same project, Cohen also sought to establish assessments of quality based on rates of utilisation of particular services. Both of these studies are described in section 3.3 of this treatise.

The Bailit and Clive Study analysed dental records of a group of general dental practices in New York and Connecticut. Data was available on all services received by 440 adult patients over a period of one to fifteen years. For each patient, clinical examination data was present measuring oral hygiene index, periodontal pocket depth and DMF status of each tooth. Using the examination and services data, a method was devised for retrospectively extrapolating the patient's dental health at each visit and at the commencement of treatment. Service data was classified into ten categories illustrating the service mix provided to each patient. It was found that there was a moderate correlation between the proportion of preventive services in the service mix and

stability of the patient's oral health over a period of time. It was found that only years in service and one of the service patterns which featured primarily diagnostic and preventive services were good predictors of oral health. Meaningful cost effectiveness comparisons could not be carried out due to the brief time span of the data and consequently limited variation in chronological change in oral health status. However, it was concluded that, based on this study, future research incorporating an extended data base and alternative regression models could be useful in analysing the cost effectiveness of dental service patterns. Thus, monitoring of practice patterns rather than discrete examples of treatment might form the basis of quality assurance reviews, with the advantage of reducing the number of cases to be investigated and diminishing administrative costs. Bailit, Balzer and Clive (1983) have questioned the validity of such focused utilisation reviews on several grounds. They refer to conflicting evidence that higher utilisation rates necessarily imply overtreatment although most studies do in fact suggest such a positive correlation. The implicit assumption that lower levels of utilisation represent a more desirable level of care is also questioned, as also is the possibility of bias against the high utiliser and the reliability of some reviews. In order to study these issues, Bailit et al conducted a prospective utilisation review system centred on three restorative procedures. Two insurance carriers with large dental benefits programmes participated and seven experienced dental consultants examined claims under simulated review conditions. The results indicated that services submitted by dentists with high utilisation rates were no more likely to be denied than those with moderate rates, reviewers did not appear to be biased

against the high utiliser, and overall agreement levels for denials between consultants seldom exceeded 50%. This study suggests that further development of focused review systems requires a better understanding of the association between utilisation rates and overutilisation and new methods for improving the reliability of reviewers.

3.10 FORMAL CASE REVIEW

This procedure consists of a regular review of particular case presentations. It can be based on either a retrospective review of cases or a prospective review of well-defined topics in order to identify problem areas. The review committee usually has a rostered reviewer for a set period and cases chosen by the reviewer, often from random selection, are presented to the meetings of the committee for free discussion. This system has been developed at the Austin Hospital in Melbourne by Legge and Hutton (1981) and is used extensively throughout Westmead Hospital. These reviews not only provide valuable information concerning the clinician's performance but also a very good insight into the overall standard of patient care in the hospital. Reports of the use of formal case review systems in Australian teaching hospitals have been published (Castaldi 1981; Legge & Hutton 1981). At the Austin Hospital in Melbourne, screening of patients to select suitable cases for review at a weekly meeting of physicians is accomplished from subjective assessments of discharge summaries, necropsy reports and inpatient review forms. This is a departure from the conventional use of criteria audits to identify review cases as it is felt that the restrictions imposed by adherence to fixed criteria prevent flexibility in making decisions about whether to study process or outcome or in establishing either "minimal" or "optimal" standards.

Collopy (1981) outlined the principles of surgical audit as:

1. provision of accurate documentation;
2. peer-group discussion of the documentation; and

3. action to be taken following the discussion.

Formal case review is particularly applicable in hospital dental practice and can be carried out in accordance with a regular meeting timetable. A random selection of records can serve as a basis with prospective reviews as appropriate in areas of special interest. From this random selection of records, a selection of cases for discussion is made and appropriate transparencies can be produced if necessary to aid in case presentation. In translation from the original the data should achieve a desirable measure of anonymity which, although not absolutely essential, should overcome inhibitions on free discussion without restricting appropriate individual counselling of the particular clinician. Generally, formal quality of care meetings in teaching hospitals in Australia preserve the anonymity of the patient but do not eliminate the identity of the clinicians. Medical staff appear to accept this frankness as a matter of course although this openness appears to serve little practical purpose, unless perhaps to act as a stimulus to good attendance! In the case of formal "deaths and complications" meetings, there should always be frank and open discussion but Dudley (1974) pointed out that they are more enjoyable when they concern somebody else's patients!

This mechanism of audit is used at the Westmead Dental Clinical School. Results of reviews carried out during the year are presented to regular school-wide Clinical Review Meetings where free discussion of results is utilised as an educational measure to improve the quality of patient care. Two examples of these reviews have been

reported recently.

1. A retrospective study of the clinical management of 67 patients with major oro-facial infections (Collins & McKellar 1986). This study provided recommendations leading to improved patient management and increased awareness of some of the difficulties which presented most commonly.
2. A retrospective clinical and psychosocial assessment of 50 patients with disruption of mandibular nerve function following corrective mandibular surgery. Results showed that within acceptable clinical and psychosocial limits, such surgery was successful. The need for informed and realistic pre-operative counselling in surgical planning was identified (McKellar & Wilson 1986).

Other topics presented over the past two years have included:

the possibilities for simple orthodontic treatment suitable for undertaking by the general practitioner;

the need for improvement in assessment and treatment planning for patients who are carriers of the HIV or Hepatitis B viruses;

a discussion, with case presentations, of deficiencies in treatment planning; and

the management of dental trauma.

3.11 PATIENT SATISFACTION SURVEYS

The importance of patient satisfaction surveys to acquaint health administrators with the feelings of patients is a well accepted principle. Providing the surveys produce valid and reliable results they are an important tool in quality assurance and a great deal of attention is being paid to such surveys today - the growth of consumerism having a considerable impact on this concept.

It has been suggested that the use of patient satisfaction surveys as an essential part of any quality assurance system enhances the likelihood that a practitioner would adopt a quality assurance system because of its possibility of acting as an effective marketing system (Kress & Silversin 1985).

A report of the approach taken at Mt. Sinai Hospital in New York illustrates how unexpected anxieties expressed by the patients are brought to the attention of hospital authorities (Speedling, Morrison, Rehr & Rosenberg 1983). Additionally, the employment of patient satisfaction surveys can be most useful in serving as a problem-seeking, problem-solving focus for dental quality assurance activities (DiAngelis 1984).

Sisty and Henderson (1974) have referred to the various factors which patients see as important in their satisfaction with their treatment. Most patients see the competence of their dentist as the major factor with other factors of lesser but significant interest being the personality of the dentist and measures for pain and anxiety control.

Similar findings have been reported by other researchers (Jenny, Frazier, Bagramian & Proshek 1973). Surprisingly, perhaps, cost appears to have a lesser significance for patients, based on these U.S. studies.

The relationship between patient satisfaction and quality of care is an interesting one. Using complete dentures as an element of patient care to be evaluated, Smith (1976) determined the relationship between patient satisfaction, technical quality of the dentures and patient personality traits. She found that although there was a high incidence of the personality traits of hypochondriasis, depression, hysteria and manifest anxiety in the 70 complete denture patients studied, most patients were satisfied with the dentures received and there was no significant relationship between personality traits and the degree of patient satisfaction. Furthermore, there was no significant relationship between patient satisfaction and the technical quality of the dentures. In another study which compared patients' perceptions of the quality of their restorations, with the evaluation of this treatment by dentists, it was found that there was no correlation between the assessments of the patients and the actual treatment quality (Abrams, Ayers & Petterson 1986). It was clear that each group was dependent on different criteria when reaching their conclusions.

It is important that, if patient satisfaction surveys are to be used as a reliable measure of the opinions of patients about the quality of care they receive, a well-designed questionnaire which can be validated should be used. A reliable, valid method of assessing the

patient's satisfaction with care and the dentist's satisfaction in providing it was reported by Koslowsky, Bailit and Valluzzo in 1974. As part of the Washington State Dental Auxiliaries Project, a 42-item measure of patient satisfaction with dental care was developed (Chapko, Bergner, Green, Beach, Milgrom & Skalabrin 1985).

Davies and Ware (1981) have also been critical of previous surveys and report that in an analysis of 25 empirical articles measuring patient satisfaction with dental care, very few considered the reliability and validity of the data analysed. These authors go on to describe the development of a self administered patient satisfaction questionnaire, report results concerning its reliability and validity and explain how to interpret it for use in measuring patient satisfaction as an outcome variable in the quality of dental care or as a predictor in studying patient behaviour.