What dental schools can do to improve the shortage of professional personnel in dentistry is the theme here. This topic is developed in terms of one school of dentistry, but the experience is more widely applicable.

DENTAL MANPOWER AND THE RESPONSIBILITIES OF THE DENTAL SCHOOLS

James R. Jensen, D.D.S., M.S.

Introduction

If you ask the average practicing dentist, he does not understand the shortage of professional personnel in dentistry. He is taking care of the patients in his practice—the people who seek his services—and that appears to be the parameter of his concern. He is incensed at all the conversation related to dentistry's inability to cope with today's oral healthcare needs. He is completely turned off at what he considers competition by expanded duty auxiliaries.

It is the responsibility of the State Dental Association, the State Board of Dentistry, and the School of Dentistry, to educate the practicing dentists not only to the absolute necessity of maximizing their operating efficiency to meet the needs of the people they should serve, but to the many advantages, increased challenges and personal satisfaction of delivering oral health care as leader of the dental team. These practicing dentists must be made to realize that dentistry has a responsibility to all of the public, and that we cannot hope to maintain our franchise if we cannot satisfy their needs. If we believe that there is a manpower crisis, and we do, we must communicate by mail, by journal, by formal and informal meetings, by continuing education in the School of Dentistry, and in colleges and vocational schools where auxiliary programs exist, as well as by open circuit television throughout the state. Our first obligation then, is to alert the practicing profession to their responsibilities and means of meeting those responsibilities.

Obviously, the most fertile ground for establishing any new concepts or changes in philosophy is in the dental school. Here, we can reasonably mold the captive embryo into the graduate of our own design. If the student is taught a method of practice, he will, in all likelihood, adapt his practice accordingly. If he is taught the value of the dental hygienist, now in her expanded function role, he will need the dental hygienist in his practice. If he is given sufficient experience and training in the use of the expanded duty assistant, he will need this auxiliary in his practice. This has been amply demonstrated with the laboratory technician.

Objectives

The recent reorganization of the health sciences in Minnesota will effectively bring all health-care providers together with a coordinated objective of team health-care delivery. To give further
identity to this, a coordinator of health science students has been appointed. Courses in community responsibility began in June involving students from dentistry, medicine, nursing, pharmacy and public health. The objective of the School of Dentistry is to educate technically competent, safe beginners for the practice of dentistry. We have slowly and painfully begun to realize that we cannot restore fast enough in our one-chair offices to keep up with the caries rate alone. We have refined our restorative techniques within the limitations of the materials and instruments used; we are able to rebuild mutilated mouths to acceptable aesthetics and function; we have preventive means that can effectively reduce the incidence of oral disease, and yet we adequately care for less than 25 per cent of our population. Producing more dentists is part of the answer. Extending the capabilities of the dentists by the efficient use of auxiliaries, is another part.

Changing concepts in the delivery of oral health care are forcing the realization that the traditional dental curriculum may not be the most adequate or appropriate means for training health professionals. These changing concepts, resulting from such pressures as (1) the disparity between the quantity of dental care available and the need for such care, especially in the low income and rural populations, (2) third party payment for dental services through insurance plans, union fringe benefits, or governmental agencies, making dental care economically available to additional millions of Americans, (3) the current and projected changes in the nature of dental practice with the use of expanded duty auxiliaries on the oral health-care delivery team, and (4) new developments in educational practice and theory demand a total revision in the design of the dental curriculum necessary to develop professional personnel for the dental health team.

The University of Minnesota is an old established School of Dentistry with a sizable enrollment, and a reputation for educating quality dentists with what may be considered a reasonably modern but traditional curriculum. Proposed changes in this curriculum involve the following three interdependent programs:

1. Diagnostic testing of students admitted to the School of Dentistry to determine skills and knowledge with regard to basic and applied sciences, as well as possible clinical skills enabling advanced placement to qualified students.

2. Student proficiency evaluations—an essential key to unlocking the present curriculum.

3. Curricular and scheduling changes permitting the student to progress in a self-paced environment to the completion of his undergraduate education with the real possibility of accomplishing it in a reduced time.

**Diagnostic Testing of Pre-Dental Students**

The students entering the School of Dentistry each year have met the minimum requirements of prerequisite courses and grade point average specified by the school. However, many students have had varied experiences above and beyond these minimum requirements that, if accurately assessed, might be accepted in lieu of prescribed dental courses. With the lock-step curriculum now existent in our dental schools, this acceptable credit is of no practical value, because no curriculum has the flexibility to permit other than the prescribed courses in their fixed sequence. Thus, criteria must be developed for accepting academic or practical experience that will, in fact, be applicable to the D.D.S. degree. If the curriculum can concomitantly be made sufficiently flexible, these credits would shorten the dental training period for qualifying students.

**Student Proficiency Evaluations**

In a large school such as the University of Minnesota, it is difficult, if not impossible, to have a good record of the clinical experiences of individual stu-
Dental Manpower and Responsibilities

In order to design a flexible curriculum, permitting students to move ahead as their own abilities and ambitions dictate, it is necessary that a method of following the individual student's activities be developed that will not only give a tabulation of his completed assignments for each discipline, but that will evaluate his proficiency or demonstrated skill at any stage of his professional development. The central task in developing such an evaluation program involves cooperative specification of the major desired characteristics of the practicing dentist in terms of informational and process knowledge, clinical judgment, clinical skill and interpersonal relations. Having specified these characteristics, a student's progress can be monitored and compared to either interim goals or the final criterion where appropriate. Evaluation thus based allows the student to compare his own knowledge and abilities against those he should have in order to be an adequately functioning professional. Level of educational progress becomes a matter of achievement to the criteria, rather than the number of years spent in training. Evaluation of this type is by necessity continuous, thereby providing the student with the opportunity to monitor his own progress. It also provides the faculty with a means of determining the degree to which instruction itself is adequate to meet the stated goals.

We are in our second year of developing such an evaluation program in Operative Dentistry. The system is computer assisted in order to allow the handling of large amounts of evaluative data in ways which would otherwise be impossible. Students' operative performance is assessed according to its achievement to criterial work, and average performance profiles are developed. Once a student has reached and maintained a criterial profile, he can progress to another phase of training without the necessity of completing a given number of operative procedures. This assures that each student will be proficient, an assurance not available simply on the basis of repeated practice. We anticipate the development of similar programs in the other clinical disciplines of Crown and Bridge, Endodontics, Oral Diagnosis, Oral Surgery, Orthodontics, Periodontics, Prosthodontics and Radiology.

The use of the computer in assisting in student evaluation has the additional advantage of providing a data bank for student grades. This permits a critical evaluation of the grading system in use which has already shown that the average grade for our classes do not change from quarter to quarter. This implies that either students are not improving, or that the evaluation does not reflect their progress. We suspect the latter. If grading is a teaching aid, evaluation should improve as the student's skills improve. If we are to identify proficient students, and permit them to move ahead as their abilities dictate, it is necessary that the evaluation improves as the student improves. We have also quantified the magnitude of variability attributable to the instructors in Operative Dentistry, as well as the variability in student exposure to instructors. The computer is providing a tool for implementation of an improved system.

Without a proficiency evaluation, there would be no method of determining the effect of a program on the product, the student. Without an effective evaluation of the students, we would be in the embarrassing position of being unable to demonstrate that we have taught anything at all.

Curriculum and Scheduling Changes

In order to allow students to proceed through the program's prerequisite to
the Doctor of Dental Surgery degree at a rate their abilities permit, opportunities for full laboratory and clinical experience and lecture-seminar offerings must be available 12 months of the year. The curriculum must undergo evaluation and redevelopment to test procedures and content, making use of existing departmental faculties and interdisciplinary combinations. All prescriptions for change would have to undergo economic analysis before implementation to demonstrate that any changes are minimally disruptive and maximally useful. Such changes must include descriptive and developmental research on such things as clinical judgment, diagnosis and treatment planning, communication with patients, auxiliaries and other professionals, as well as pilot testing of new instructional procedures.

Development necessitates a well-equipped and staffed media center, capable of producing self-instructional audio and visual materials, video tapes of instruction, and video equipment available to students for self-evaluation. Such a plan would allow the student to evaluate his own progress and consult with faculty on a tutorial basis, determined by his own needs and proficiencies. Flexibility in scheduling would result from alternative, self-instructional materials utilization, where they make an appropriate alternative to traditional instruction, thereby enabling faculty to work with more students on an individual basis. It also allows students to take maximum advantage of their background and learning proficiencies as they progress through the curriculum. This should result in a savings in time spent by and on students since their progress would be more efficient. It would also reduce the considerable waste met by failing students, who are overcome by the current lock-step pace because of background or speed of learning. Criterion evaluation should eliminate the occasional error of passing the unqualified student because the school is unable to specify the minimum qualifications to be attained.

Our second major obligation in the school is to produce an efficient, effective curriculum to educate dentists to meet society's needs.

Discussion

Dental auxiliaries have undergone dramatic changes in the past few years. Fortunately, dental leaders in government, organized dentistry, and dental education, have been focusing on the problem of manpower shortage, and have seen the need to develop auxiliaries as the most practical means of providing adequate oral health care for the public. The Dental Auxiliary Utilization programs sponsored by the United States Public Health Service for all dental schools, are prime examples of the foresight of dentists in government planning for the needs of the people.

Stanley Wenberg, Vice President of the University of Minnesota, stated recently that rigidity within educational institutions and professional licensing and certification procedures, has led to a "highly skewed manpower condition with excess at the professional level and a near void at the intermediate, semi-professional level." He further stated that "The possible role of an assistant physician, an assistant dentist, a social worker apprentice, a journalism technician—is cut off from further discussion because of 'the law,' 'the code,' or 'the regulation—as if all of these were handed down from God."

"The greatest void in American education today falls between those skills, programs offered in the vocational schools at and immediately after high school, and the baccalaureate programs offered by America's colleges and universities."

It is necessary now to go beyond the four-handed concept of dental practice and increase the size and effectiveness of the dental health team. There has
been some excellent clinical experimentation with expanded duties for auxiliaries, hampered only by state practice acts that limit the use of such auxiliaries. There is nothing the dental auxiliary cannot do with proper training. It is only necessary to identify those phases of dental practice that can be delegated to the auxiliary working on the health-care team under the supervision of the dentist, and prescribe a training standard for those duties.

One major problem dentistry has had with its auxiliaries, is retention in the profession. There are many reasons for this: compensation, challenge, diversification of duties, marriage, to mention a few. If the average professional life of a dental assistant is, as has been reported, less than two years including the training period, then dentistry needs to examine its concept of providing oral health care and the provision it is making, both educationally and in practice, of its paraprofessional personnel. We must provide challenge and opportunity for advancement for the people we expect to attract into the profession.

Recent changes in the Dental Practice Act of Minnesota have enabled our State Board of Dentistry to innovate our oral health-care delivery system by permitting implementation of some expanded duties for dental assistants and dental hygienists. This is finally giving action to the many studies proving the effectiveness of auxiliaries on the delivery of oral health care, and giving greater responsibility to other members of the dental health team. The results of the Conference on Oral Health Care for the State of Minnesota (September 21–23, 1970) will undoubtedly broaden the scope of auxiliary training, and create a variety of "specialties" for auxiliaries permissible by law that will offer continued challenge for persons on the dental health team wanting to expand their knowledge and opportunities. With the utilization of expanded-duty auxiliaries now a possibility in practice and beyond the experimental environment, we are now able to train the undergraduate student in a group practice, multiple auxiliary in the Dental Auxiliary Utilization facility.

Our two-year program in Dental Hygiene was established at the University of Minnesota in 1919. Our classes of 60 students are not adequate to meet the needs presented to them. We anticipate the occupation of a new physical facility in two years, at which time, we will be accepting 150 dental hygiene students in each class. This, we hope, will more realistically approach the needs of our practitioners for this auxiliary.

Our program in Dental Assisting began in 1953, only after the university administration was convinced that this program existed solely for the purpose of teaching four-handed dentistry to the undergraduate dental student, and that the increased efficiency in our clinical operation resulting from their use would increase clinic income sufficiently to support the program. We were able to demonstrate this. The program was not considered a university discipline, but a certificate course. Our program for the dental assistant still exists as the only economically feasible means of providing large numbers of assistants for the students in their undergraduate clinical programs. The production of qualified certification-eligible dental assistants is a welcome byproduct of this effort.

The schools of dentistry must provide this team environment for their dental students, but cannot expect to carry the burden of educating the auxiliaries for the practicing dentists. This can be done, as it is in Minnesota, by a cooperative effort of the School of Dentistry with state colleges and vocational-technical schools. The university should be prepared to train teachers, develop curriculum, course materials and schedules, and serve as consultants in the planning of new schools. They should actively promote the establishment of new schools...
throughout the state to offer training where the students are, and where they are needed, following completion of the courses.

Our third obligation then, is to provide an oral health-care delivery concept involving all auxiliaries for our undergraduate dental students. This will also involve the training of these auxiliaries. Educators must take their place with other dental leaders in continually searching for better means to provide oral health services for all the people.

Conclusion

I close with a statement from the Journal of Public Health Dentistry, Fall 1968, by O. R. Menendez: "Since the professions in a university are expected to modify in a favorable way, the physical, biological, social and cultural aspects of their environment, professors of dentistry are expected to possess a broad practical knowledge of the characteristics of the country, which they are obligated to serve. This obligation demands that they orient the dental curriculum to society's needs and that they contribute efficiently to the solution of this society's needs."4

REFERENCES


Dr. Jensen is Assistant Dean for Academic Affairs, School of Dentistry, University of Minnesota, Minneapolis, Minn.

This paper was presented before the Dental Health Section of the American Public Health Association at the Ninety-Eighth Annual Meeting in Houston, Tex. on October 27, 1970.