OPERATIVE DENTISTRY

SUPPLEMENT 2
1981

Profile of a Clinical Teacher

The Need for Graduate Education in Operative Dentistry

OPERATIVE DENTISTRY

Aim and Scope

Operative Dentistry publishes articles that advance the practice of operative dentistry. The scope of the journal includes conservation and restoration of teeth; the scientific foundation of operative dental therapy; dental materials; dental education; and the social, political, and economic aspects of dental practice. Review papers and letters also are published.

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SUPPLEMENT 2

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PART 1: PROFILE OF A CLINICAL TEACHER

OPERATIVE DENTISTRY, SUPPLEMENT 2, 1981, 2-4.

Profile of the Future Teacher of Clinical Dentistry

BEN W PAVONE

A cause for growing concern in some academic circles is the recruitment, promotion, and retention of competent clinical faculty. How can dental schools accommodate the increasing use of academic criteria in the recruitment and promotion of clinical faculty and still maintain excellence in clinical teaching?

More and more dental schools are being required to consider a broad spectrum of academic criteria in the appointment and promotion of faculty. In addition to evidence of professional competence, these criteria include educational background, degrees earned, teaching experience and ability, numbers of essays and clinics, papers and publications, awards or honors, membership in professional societies and organizations, community service, research productivity, and other kinds of creative activity.

The trend toward the application of these criteria is most apparent in those schools that are located in close affiliation with other health science schools or on general campuses. On these campuses, the committees that approve appointments and promotions usually include representatives from disciplines outside of dentistry, such as medicine, pharmacy, public health, or the basic sciences. Dental schools on these campuses have had comparatively little difficulty in promoting faculty whose teaching responsibilities are in the basic, biological, or related dental sciences that require instructors with advanced degrees or specialty training. On the other hand, faculty have had considerable difficulty in obtaining promotions when they are in clinical disciplines, such as operative dentistry, oral diagnosis, dental hygiene, or prosthodontics, which require instructors with less extensive academic backgrounds than do the basic sciences, but which require a proportionately higher percentage of contact teaching hours. Efforts to provide adequate clinical instruction while offering faculty in these clinical disciplines sufficient time for the writing, research, and other creative activity needed to qualify them for promotion present administrators with a dilemma of seemingly insurmountable proportions. Administrators that are seeking to recruit academically qualified, full-time faculty for clinical teaching have discovered that they are in a highly competitive market, and that it may be several years before a significant number of well-trained graduates in clinical disciplines can be attracted to full-time academic careers.

I submit that the current emphasis on academic criteria for the appointment and promotion of dental faculty is not likely to decrease in the foreseeable future. If a dental school is to survive as a strong academic component of a general university or health science

University of California, School of Dentistry, 3rd and Parnassus Avenues, San Francisco, CA 94143, USA

BEN W PAVONE, BS, DDS, dean emeritus; Postgraduate Division, C-603

"if a dental school is to survive as a strong academic part of a university it must utilize the same policies as other disciplines"

campus, it must accept and utilize the same policies of appointment and promotion as do the other academic and professional disciplines.

How, then, can a dental school recruit clinical faculty that meet these criteria and how can these teachers be prepared for promotion?

Several options are available to deal with this problem, some of which are academic and some administrative. At the academic level some schools have successfully developed a system of two tracks for promotion, with both tracks leading to tenure or security of employment. Under this system one of the tracks includes the regular academic series, in which promotion is based primarily upon faculty achievement in research, publication, and other creative activity. The other track includes faculty in the full-time clinical series, in which more emphasis is placed on teaching ability and presentation of clinics and essays than on publication and research. In this series, clinical research is given the same weight as basic research. It is important to point out that campuses utilizing this two-track system are reluctant to grant tenure on the basis of teaching activity alone. Both tracks accrue the same benefits, but membership in a faculty or academic senate may be restricted to faculty in the regular academic series.

Other schools, faced with difficulty in obtaining promotion and tenure for their full-time faculty, have developed a system of two tracks: one track that leads to tenure, for the regular academic series; and one track that does not lead to tenure, for a clinical or adjunct series. Under this plan all appointments that lead to tenure, including most full-time clinical appointments, are made in the regular academic series, with considerable flexibility allowed in the application of academic criteria for promotion. For example, evaluation of faculty in the biological and basic science disciplines places greater emphasis on basic research and publication than does evaluation of clinical faculty, which emphasizes teaching, presentation of essays and clinics, clinical research, and publication of clinical studies. The clinical or adjunct series under this two-track system is used for part-time faculty and for those full-time faculty that intend to devote all of their time to clinical or laboratory teaching and have no desire to qualify for tenure. They may accrue retirement, sabbatical leave, and other fringe benefits, but this series does not lead to tenure and the "up or out" rule does not apply to these appointments. Faculty in the clinical or adjunct series may, however, request transfer to the regular academic series whenever they qualify.

Faced with the prospect of an increasingly critical review of their faculty appointments and promotions on the basis of traditional academic criteria, most administrators of dental schools would choose to enhance their school's academic status by providing their faculties with opportunities for professional

"some schools have developed track systems, one leading to tenure via the academic steps, the other clinical, with no tenure"

advancement, recognition, and growth, given the assurance that the quality of clinical instruction would be maintained. What, then, is the kind of administrative support and planning required to implement a program that will attract the kind of person that seeks a career as a teacher of clinical dentistry and also meets the academic criteria for appointment and promotion?

To be successful, the plan must include an adequate ratio of faculty to students in those disciplines where the high percentage of contact hours in teaching precludes much opportunity for other academic activity. A higher ratio of faculty to students would provide faculty with release time for research, writing, and other creative activity on an equal basis with faculty in nonclinical disciplines. It

"what administrative program will attract those that seek a career in clinical teaching and also meets the academic criteria?"

is essential that this ratio be increased if faculty are to have this release time since quality of the educational program must not be compromised. Improvement of the ratio of faculty to students is not easily attained in these days of budgetary constraints; however, chief campus officers are generally receptive to any program that increases the reservoir of scientific knowledge and enhances the reputation of the school and the campus. Administrators should also be aware of the opportunity to improve the ratio of faculty to students through the addition of a significant number of extramurally funded, part-time faculty, thereby providing some release time for full-time faculty.

It is important that administrators carefully monitor productivity when allocating release time for academic endeavors. The distribution of workload for clinical teaching, teaching preparation, basic or clinical research, creative activity, publication, and intramural or extramural practice may be different for each faculty member. In the case of faculty that do not desire to engage in the academic activities required for promotion, the workload can be adjusted to place an increased proportion of effort on clinical teaching, which would be appropriate for the adjunct or clinical series. Since all faculty, irrespective of their disciplines or academic interests, should be accorded the same opportunities for promotion and other rewards and benefits, the system should include sufficient flexibility to accommodate changes in the career objectives of individual faculty.

Another option that is gaining ever greater attention in academic circles is that of closing the gap between university and nonuniversity salaries. It does not appear that all schools of dentistry will be able to provide competitive salaries funded from their own resources. Budgetary constraints, whether they derive from inadequate state support or limitations on tuition, coupled with chronic inflation, most certainly have a critical impact on salaries and the operating budget. Given such limitations, how can dental school administrators offer the competitive salaries necessary to recruit and keep competent clinical faculty?

Most schools will find the solution in the development of a well-organized and administered intramural or extramural program, or both, for faculty practice. Unless underfunded schools maximize opportunities for faculty practice as a means of providing competitive salaries, there is little hope of recruiting and retaining competent faculty. Although almost all dental schools in the United States allow some form of faculty practice, some have space or funding restrictions that preclude the establishment of efficient and effective programs. Every professional resource should be employed to assist those schools in developing programs of faculty practice that will enhance the school's ability to attract and retain new clinical faculty.

"a new type of clinical teacher will evolve, who will conduct clinical research and publish on an equal basis"

If all faculty are treated equally with respect to workload and release time, and if competitive salaries are provided, it is reasonable to assume that full-time clinical teachers that will qualify for promotion in the regular academic series can be recruited. As a result, a new type of clinical teacher will evolve—one who will be a highly competent clinician, who will present essays and clinics, who will conduct clinical research and publish the results, who will engage in university and professional activities, and who will be involved in patient care. Thus the clinical teacher may acquire a local, national, or international reputation for his or her achievements on an equal basis with faculty in other disciplines.

Given the opportunity to succeed in an academic environment, the industrious, ambitious, full-time clinical teacher can make a significant contribution toward the advancement of knowledge in the field of clinical dentistry, without compromising the quality of clinical instruction.

Teaching in Clinical Dentistry

ROBERT B WOLCOTT

An architect was having a difficult time with a prospective homebuilder. "But can't you give me *some* idea of the general type of home you want to build?"

"Well—" replied the man hesitantly, "all I know is that it must go with the antique doorknobs my wife bought in Vermont."

Probably most of us are prone to continue our teaching programs year upon year without yielding to any form of change because it is uncertain or unproved; or because there is no assurance that change would improve the teaching methods; or because it would involve too much work. When we must face a curriculum change are we likely to hesitate and ask "will it go with an antique doorknob" in our present curriculum?

Planning and Delivering a Course

The curriculum of a school is a creation of its faculty, and in turn the careers of the members of the faculty are at stake because of the monster it has created. An instructor faces a broad spectrum of demands placed on him to ensure his advancement, but if he is fortunate he may be able to view the demands as opportunities to become a well-balanced teacher in a progressive institution. In that case he must rely on the support he is given by his dean or department head, the advice and encouragement he needs, and the opportunities to expand his knowledge and skills as a teacher and clinician.

We have all heard the statement to the effect that a teacher is born, not made. What truth there is to this is not known, but it would be safe to say that good teachers can be developed if they possess interest and enthusiasm for teaching. These building blocks are essential to develop teaching skills, to challenge a student's thinking, to share his professional abilities and knowledge, to expand his knowledge through prodigious reading and attendance at stimulating meetings, to demand achievement by students in a manner that is respected and accepted without resorting to dogmatism.

Many instructors view lecturing as the foundation of teaching. I submit, however, that a course in operative dentistry can be conducted without formal lectures. The planning of the course, to be successful, must include a syllabus so explanatory that even an instructor can follow it; there must be agreement among

University of California at Los Angeles, School of Dentistry, Los Angeles, CA 90024, USA

ROBERT B WOLCOTT, DDS, MS, professor and chairman of the Section of Operative Dentistry

"good teachers can be developed if they possess interest and enthusiasm for teaching"

the instructors on its substance; there must be time available for instructors to discuss with one another the material to be covered in forthcoming laboratory sessions; and there must be a rationale for every concept or principle that is to be taught.

Most of these matters can be dealt with through weekly faculty sessions. The course chairman expects each instructor to read the manual assignments and to raise questions. The principal topics of the segments for the forthcoming week are discussed in detail. The information from these faculty meetings is then carried into the subsequent sessions of discussion with groups of students. Interestingly, in these discussion groups of 12 to 15 students each, the instructor's real teaching abilities become manifest.

In contrast, most of us have found that the lecture hall frequently becomes a forum for a minority of extroverted students, who enjoy interrupting anything in order to hear their own voices echo through an auditorium. Within a small group the instructor can invite discussions, arguments, and questions. However, discussion must be tempered to accomplish the course objectives, yet amplify questions and clarify misconceptions. Structured presentations are not encouraged and the instructor is free to conduct the discussion groups as he sees fit—before, during, or after the laboratory session.

Criteria

Today's student is not apt to accept the ridiculous rationale often espoused by the teachers of my generation when they responded with statements like "because I said so" or "that's just the way it is." How can we establish credibility and uniformity with such remarks? Students and faculty deserve to know the criteria for an acceptable cavity preparation or restoration. Even beyond that, they deserve to know the rationale behind these criteria. Without a sound understanding of these basic elements confusion will result. If we assume that the faculty gives these tenets via lectures, discussions, reading assignments, and demonstrations it is reasonable to conclude that the teachers have a strong understanding and recognition of the criteria and their rationale. Unfortunately this is not always so. Usually there are adequate resources, especially today with the abundance of texts, manuals, and other audiovisual aids that have been produced in recent years, and it is fair to assume that we can achieve a reasonable understanding about preparation and restoration.

The problem seems to be that we can't gain consistency among our instructors. The concept of the study club can be applied here with success. The faculty members prepare cavities and restorations on typodonts and on patients, and the procedures are critiqued by colleagues. I can assure you that these activities will produce a gradual coalescence of opinions until objectionable variations are minimized to tolerable limits. The need for persistent training in service was evident when we observed that our grading of a laboratory procedure produced variations among instructors of as much as 20 to 30 percent. After we required the faculty to prepare the same procedures as the students, then devote a brief time to critique each other's work, the variation in evaluating performance dropped to 10 percent. More recently we accumulated similar data on a weekly "mock board" examination (see below).

	Preparation %	Restoration %
EXAMINER NO 1	36.61	29.31
EXAMINER NO 2	37.31	29.18
Scoring Range	0-50	0-35

n = 54

Two instructors graded 54 procedures and their mean scores reveal they were quite consistent. Scores for cavity preparations for both amalgam and gold foil produced mean values of 36.6 and 37.3 of a maximum of 50 points. Grades for restorations produced means of 29.3 and 29.2 of a maximum score of 35 points.

Faculty Development

Changes, whatever they may be, require some form of sacrifice. Unless we adopt a five-year curriculum to accommodate the burgeoning of information in dentistry, there has to be a generous condensation of lecture, laboratory, and clinic hours, especially if there are to be attempts at innovation. No doubt shudders would resemble quakes if a suggestion were made that we relinquish cherished class, laboratory, or clinic time. Nonetheless, many schools have realized that benefits outweigh the cost of sacrificing a few contact hours by initiating a program of faculty development. These sessions have been created for the faculty to stimulate professional growth and to strengthen the teaching programs. If there is resistance to giving time for such programs to strengthen the quality of instruction, one can admonish recalcitrants by saying that they should not go to sleep with the remark that "it can't be done," for they will be awakened by the noise of somebody doing it.

Other Efforts To Develop Teachers

Finally, there are other considerations or policies that an operative dentistry department may use to benefit its teaching program:

1. If the school strongly discourages inbreeding of faculty, new instructors can commence their affiliation by teaching in the preclinical course. This gives the teacher a thorough understanding of philosophies espoused by the department, and an opportunity to apply subsequently the same criteria in evaluation of student performance in either laboratory or clinic.

2. Rotate instructors between preclinical and clinical courses. It is interesting to observe how many instructors value this and gain a renewed appreciation of the efforts expended by the "real" teachers who devote so much effort to preclinical training. Likewise, many seem to enjoy preclinical teaching because they appreciate the rapid progress of students in contrast to the slower changes in the clinical environment.

3. We should encourage instructors to develop and present elective programs for senior students.

"many instructors value the rotation between preclinical and clinical courses"

4. We can encourage attendance and participation in professional meetings. Then at regular staff meetings the instructors should be asked to report on any new developments, concepts, research, and so forth.

5. Encourage faculty to audit, even participate in, the courses of other disciplines within the school. Our limited experience with this aspect has been most rewarding, but the time required has precluded regular and generous participation. In lieu of this we have had faculty members from periodontics, surgery, administration, prosthodontics, and fixed prosthodontics speak at monthly staff meetings. There should be no limits imposed on the areas that could be covered.

6. Rotate positions within the department to each of the teaching staff. Tasks include construction of tests, fabrication and distribution of models, operating the tooth bank, administration of courses, conducting clinical examinations, administration of the study club, and the like. Those who assume administrative duties learn to develop schedules, maintain student records, prepare grade reports, and provide counseling for students.

7. Encourage collaboration with other departments in the school. Many of the conflicts of a teaching program in a school can be resolved by the simple procedure of communication. A conflict with the pedodontics department in the teaching of pulp capping and the use of temporary restorative materials, bases, and liners was resolved in this manner.

8. Encourage participation in faculty meetings to maintain good communication and fraternalism. Many schools conduct faculty retreats at which excellent programs are presented by faculty or special guests.

9. Take students' evaluations of teacher performance very seriously and review them with each faculty member. Many of our weaknesses are most evident to others.

10. Since the days of Project ACORDE, and more recently in CODE, we have learned that other schools have much to offer in their approach to various problems. Each year two

"schools in various regions of the country have much to offer other schools in their approach to problems"

instructors from each of the southern California schools, and occasionally from the northern California schools, join together to conduct mock boards at each other's school. Students gain from this by learning from these new instructors, and faculty members gain in many ways from what they see and hear at these sessions. It would seem reasonable that schools in other regions of the country could share this kind of teaching with other schools in their region.

11. There is a continuous need for teachers trained specially in operative dentistry, who have emerged from graduate programs. Perhaps more schools would promote such efforts if there were appropriate implementation by faculties. We should applaud the few schools that support graduate programs, for from them are emerging some of the future leaders of our academic programs—both in teaching, professional competence, and research.

12. Lastly, research is a much used and abused term. There is an enormous difference in the emphasis that is given to research by the various teaching institutions. The demand of some schools on their teachers is so great that there is little or no time for an individual to be engaged in any form of creative endeavor. At the other end of the spectrum we may find some individuals whose main responsibilities in a school are to conduct research with unremitting fervor. Most of these individuals have minimal responsibilities in classroom and clinic. It is rare that one can identify a teacher of operative dentistry whose principal duties lie with research, unless he is supported strongly with research funds.

Again, there seems to be a need for a mellowed blending of research into teaching programs. This serves to stimulate the teacher, to give him an opportunity to find answers to problems, to better appreciate and understand the accomplishments of others, and to contribute in a meaningful way to the advancement of our profession. It is unlikely that a teacher who has valued research as a tool of learning will give an unsavory, confusing, or dogmatic reply to a student's inquiry.

I don't feel comfortable in this role which suggests that I have responded successfully to the needs of a school, its students, or its teachers. There are many in this audience who have enjoyed a vastly greater success for a greater number of years and would have a perfect right to question my right to be on the program. It reminds me of the congressman who sent out a questionnaire to his many constituents asking, "What do you think is the most important thing that Congress can do?" One reply that he received was, "Mind its own business." But unless we are willing to talk about the problems we have, and the methods employed to resolve them, communication is stilted, nothing happens, and we stagnate. Even the lowly turtle would get no place if he didn't stick his neck out!

Portrait of a Clinical Teacher's Career Development in Research

EARL W COLLARD

Success is a journey, not a destination.
—Ben Sweetland

Clinical faculty members are frequently attracted to an academic career because it promises a congenial life style and a stimulating environment within which personal and professional self-fulfillment can be realized. Building upon the faculty's basic commitment to the dental school, a program of research development that enhances and encourages that congeniality and environment can be a valuable tool in strengthening present faculty as well as realizing the full potential of new faculty in the future. All faculty should be prepared to face the practical realities of dental education—its responsibilities, its successes, and its defeats.

The expectations for clinical faculty should vary according to the stage of their professional development, research experience, and the extent of their primary teaching responsibilities. How they meet these expectations, whether they become master or victim of circumstances, depends largely upon their preparation and the institution's dedication to academic excellence in all areas of dental education including research.

University of Oklahoma, College of Dentistry, Oklahoma City, OK 73190, USA

EARL W COLLARD, DDS, MS, professor and chairman of the Department of Operative Dentistry

THOSE FORMATIVE YEARS

Give the young men a chance to do something and to become somebody.
—T. T. Munger

The average young dentist in his initial faculty appointment is basically unprepared to conduct in-depth research. We may assume that he has been adequately trained in dentistry, and that he has had some training in research leading to an advanced degree or specialty. His experiences as a researcher have been minimal and secondary to the objective of completing a degree. During his years of professional education he has been influenced by a variety of teachers, each with a personal style of research behavior. There is a strong tendency for him to mimic some of their techniques—whether good or bad. As a student his research efforts were probably carefully monitored. Now he must begin with minimal

guidance on new endeavors and new problems. His knowledge about governmental agencies and professional societies, particularly those that can help him get started on his own research program, is much less than generally assumed. Finally, his knowledge about the politics or mechanics of his department and school is limited.

Accordingly, we find at the time of the initial faculty appointment the university has acquired an individual that we hope possesses the potential for independent research but has not yet acquired the experiences to do so. Intelligent action must be taken to inform the new faculty member exactly what is expected and how he may work within the educational system to promote his academic career.

Initial Orientation

The new faculty member needs an orientation into the aspirations, policies, and needs of his department and the university. This orientation should be explicit as to how the expectations of academia will affect his day-to-day existence. The interrelationship of teaching, research, and service should be openly discussed in regard to encouraging growth in all areas. At the same time, the criteria and methods by which his academic career will be evaluated should be clarified.

A significant portion of the orientation should be devoted specifically to the university's commitment to quality research. Within the budgetary and teaching constraints placed upon the department, every effort should be made to inform the beginning teacher of the following assistance and support services:

1. University and departmental sources of aid for beginning research
2. Availability of support facilities, both laboratory and clinical
3. Other support such as test equipment, computer accommodation, secretarial assistance, and research administration
4. Time commitments for teaching, preparation, research, private practice, service, etc.
5. Travel funds for research presentations or scholarly activities
6. Other academic rewards for accomplishments such as promotion and tenure

Above all, the department should be sensitive to the fact that the new faculty member will be attempting to develop a research program and provide him with a reduced teaching load during his first stages of development. It is most important to establish an understanding relative to commitments of time in the areas of teaching, research, and service, and it is preferable to have this agreement in writing. Included in the understanding should be a program of evaluation to encourage growth in all areas. The following is a sample agreement, which illustrates the relationship that exists between commitments of time and evaluation of efforts.

AGREEMENT:

It is understood the faculty employment, in the _____ Department, University of _____, College of Dentistry, is based upon the following time commitments:

1. TEACHING 60% (student contact, didactic, laboratory, clinical, course preparation, etc.)
2. RESEARCH AND CREATIVE ACTIVITIES 20% (research, publications, graduate education leading to advanced degrees, specialty board preparation, clinical presentations, etc.)
3. SERVICE 20% (treatment of private patients, presenting continuing education courses, university commitments, local, state, and national organizations)

It is understood that efforts and accomplishments regarding promotions and tenure will be evaluated or judged with the same proportional emphasis as outlined in the time commitments listed above.

Financial Assistance

Many dental schools are limited in their resources and can offer only the basic necessities in support of research. It is their responsibility to supply encouragement and a creative working environment. If any possibility exists, awards and support grants consisting of financial aid should be established for the beginning faculty member to provide assistance in scholarly and research endeavors. These grants should be well publicized and should be awarded on the basis of specific proposals somewhere in the range of $100 to $3,000. In other words, the research of the young faculty member and his efforts as a creative and contributing scholar must be encouraged and rewarded.

THOSE MIDDLE YEARS

Probably the happiest period in life most frequently is middle age, when the eager passions of youth are cooled and the infirmities of age not yet begun.

—Thomas Arnold

The middle years of faculty development involve the faculty member who has paid his dues by being around long enough in academic pursuits to have established himself. He probably has not experienced any sensation of transition from the early to mid-career phases of his development. He has developed his own style and commitment to research. Interest patterns may be entrenched for some. Others may change patterns as time passes and as new interests arise. It can be a time of re-evaluation, bringing forth disappointment, restlessness, and lethargy or it may bring forth renewed creativity and new challenges. Some will recognize the probable limitations on their accomplishments for the remainder of their academic careers. They desire new challenges, a change in their routine, and the establishment of new goals.

The key factor in accelerating the research and creative accomplishments of the faculty member in those middle years is the stimulation of change. New experience seems to be a prime component to move established educators on to new and more varied pursuits. Above all, their contributions to the profession must be recognized and the introduction of change be handled with sensitivity, dignity, and tact. In terms of experience the middle years should be the most productive time of the academic career.

Prompting a Change

Leaves of absence are a most important means by which a faculty member's research effectiveness may be enhanced. A sabbatical leave provides a new or renewed opportunity for creative achievement through study, research, writing, and travel. A leave may be designed either to involve concentrated specialized effort or to enlarge one's perspective. Even short leaves of absence can provide a change for a single-minded pursuit of research objectives.

Faculty in mid-career should be encouraged to come into contact with active researchers in other institutions. The opportunity to participate in seminars with research leaders or to observe research in progress can stimulate the faculty with new ideas, new problems, new information, new methodology, new data analysis, new colleagues, new opportunities, and renewed energies toward creative efforts.

During those middle years the faculty member is a valuable resource to the institution because of the contributions and public relations he has made in research. He is an ideal person to promote team research. This form of research is particularly valuable in stimulating faculty members that have lagged in research productivity. Faculty in mid-career have been around long enough to become known and their services will be requested.

Research Assistance

Dental faculty should have generous support for their participation in research-oriented professional organizations. The university should pay full expenses for travel to professional meetings to present the results of their investigations. Travel funds that will not even cover the room charge of a second-rate motel twelve miles away from the presentation site are inadequate. Faculty should not be penalized with out-of-pocket expenses when they are representing their center of higher learning. A university should recognize that the holding of an office in an organization is an important activity and that these experiences among the faculty do benefit the university.

Although research support for individual faculty members is meager at best, the university should do all it can to increase assistance to faculty in meeting their personal research expenses and obtaining necessary research facilities and equipment. Increased support is necessary for those preparing research proposals which will ultimately attract outside funding and attention.

Last but not least, some form of central clearing house for information on sources of research support should be maintained and made available to faculty in all areas of study. The administration and department should co-

ordinate their efforts to facilitate preparation of proposals and to disseminate information that will help faculty acquire outside assistance needed to perform research.

PRERETIREMENT YEARS

If you take all the experiences and judgment of men over fifty out of the world, there wouldn't be enough left to run it.
—Henry Ford

It is a serious error to imply that all professors who reach the later years of their professional careers are less productive as individuals or researchers than their colleagues of younger years. It does seem logical to assume, however, that there is greater variation in desire and ability to provide original investigations than is found in their younger colleagues. A number of attributes are necessary for effective research that should be taken into consideration for the dental educator nearing retirement. Some of these are general health, physical energy, mental alertness, intellectual curiosity, personal ambition, and drive. Another factor that may slow down productivity is that financial pressures are often less acute—not the result of university remuneration but because their families are grown and their homes paid for. Some may wish to retire at an early age while others see this time as an opportunity to fulfill some of the lifelong ambitions they never had time to pursue in the past.

Preretirement career problems are somewhat different and are often unpredictable because of wide ranges of interests and intellectual skills. There is a strong tendency to warehouse senior faculty by overcommitting them to committees, administration, and other paper-shuffling activities, which can isolate them from the enthusiasm and creativity of their junior colleagues. Opportunities for cooperation with younger faculty, to the mutual benefit of both groups, must be provided. The problems and goals of faculty approaching retirement should be recognized and approached fairly and frankly.

Rejuvenation

All motivating measures should be considered for older faculty to keep their research interests alive. Changes in areas of responsibility need to be instituted wherever possible. They need new challenges, a sense of usefulness, continued opportunities to contribute, a renewed feeling of belonging, and a new purpose to create. The development of a properly balanced research program requires the wisdom and experience of the older investigator along with the vigor and incisiveness of the developing scientist.

THE WRAP UP

The development of the research career of a clinical teacher may take too narrow a range. There may be need of a broader scope, or a higher aim. True dental research means more than the pursual of a specific course of study. It means more than the preparation for a publish or perish syndrome that now exists within academia. It has to do with the whole fascination of enquiry, creativity, and the wisdom of understanding—each a stimulant for the tranquilizer of day-to-day routine.

Dentistry has had its great teachers, men and women of giant intellect and extensive research. Their writings have stimulated thought and opened new fields of knowledge into the mysteries of dental disease and its associated treatment. Many have been honored as guides and benefactors of their profession. We can trace a common line in these teachers back to the beginnings of dentistry as we know it. Each gained new treasures of knowledge by allowing mental capacities to develop and increase through investigative study.

The development of such a faculty is the concern of all who wish to create a superior dental school. Administrations must provide sincere encouragement and an atmosphere of creativity for their clinical faculty. Lip service to these ideals is not enough; support must be forthcoming even if it means the allocation or reallocation of limited funds. There are many dental mysteries yet to be solved.

Portions of this paper were based on a report by the Faculty Senate Committee on Career Development, University of Oklahoma, Norman, Oklahoma, "A Career Development Program for the University of Oklahoma," October 1973: S. D. Christian, G. de Stwolinski, M. C. Jischke, J. W. Keys, W. H. Maehl, B. R. McDonald, and D. Truex.

Administration and Professional Service

WILLIAM N von der LEHR

To adequately cover a topic as encompassing as administration and professional service, one would like to approach these subjects from as broad a background as time would permit. In this instance, however, I must limit the discussion to some personal experiences and allow the members of the audience to relate these impressions to their own individual circumstances.

As compared to many of you, I am a relative newcomer in academia, just finishing the tenth year, of which six and a half years have been as department head. When a new person takes over a department, an assessment of that department is imperative. Would it be wise to institute immediate changes? Or is the program sound as it now exists? In this instance a program of change was instituted. There were some personnel changes, shifts and additions of course directors, and a basic change in laboratory teaching, which involved a $75,000 revamping of a nearly new laboratory. Some of the simplest changes involved tremendous hours of effort. For example, when we changed burs to produce rounded line angles, all of our models and many of our slides had to be redone. This drive for improvement has deeply involved the faculty and created an unbelievable amount of work, but out of this has developed a sense of departmental pride and achievement.

In an assessment of what we have accomplished as an operative department, one wonders what part can be attributed to good fortune and timing, and what part comes from hard work and dedication. Undoubtedly both play a part.

Louisiana State University, School of Dentistry, 1100 Florida Avenue, New Orleans, LA 70119, USA

WILLIAM N von der LEHR, AB, DDS, MAT, FAGD, professor and head of the Department of Operative Dentistry

DEPARTMENTAL ORGANIZATION

The operative department consists of six full-time and six part-time faculty and two secretaries. One secretary is assigned to the

"we allow an opportunity for each faculty member to be a course director"

department head, the other handles typing for the rest of the department and takes care of the records and grades of students. This division of duties allows full secretarial support for faculty whether they are working on committee assignments within the dental school or participating in projects from without.

All full-time faculty are course directors of at least one course. Some involve courses in auxiliary education and conjoint courses with other departments. The added responsibilities of these auxiliary courses are welcomed by the department because they allow an opportunity for each faculty member to be a course director, to participate in writing course outlines and objectives, to prepare teaching materials and to lecture. This is excellent experience for the younger faculty and builds a strong curriculum vitae.

PROFESSIONAL SERVICE

The department is encouraged to participate in school, state, and national interests as well as community endeavors. Among the operative faculty is the secretary-treasurer of Omicron Kappa Upsilon, past president of Omicron Kappa Upsilon, the chairman of National Children's Dental Health Week, a member of the New Orleans Dental Conference Committee, a past scientific chairman of the New Orleans Dental Conference, two church deacons, and much interest in the student table clinic program. Many lectures have been given to civic groups such as Explorer Scouts and the American Foundation for Negro Affairs. The department presents continuing education courses for the dental community.

Each faculty member is given two half-days for intramural practice. This allows patient contact, which keeps a person sharp professionally. It provides additional income, builds rapport with the students, and provides time for the faculty to assess new materials and techniques.

The intramural practice is designed specifically for the benefit of the practitioner. The members of the department practice general dentistry to the extent of their capabilities and interests. There are no minima or maxima on how much one can earn. Weekend practice is available if one chooses it. It is hoped that the intramural dental practice would serve the dental community as well as offer a service to the lay community. One department member serves as administrator and another is on the advisory committee.

TEACHING RESPONSIBILITIES

Of the remaining eight half-days, five are used for direct contact with students, and three are used for grading projects, preparing teaching materials, and helping students finish laboratory work needing progress checks. All faculty are encouraged to counsel students when asked, and much time is spent "one to one" with students.

The physical plant at the school of dentistry is as functional as it is beautiful. The operative department is fortunate to have a large laboratory adjacent to the student clinic. There is always a faculty member present who can assist a student with treatment planning, wax patterns, or other questions that arise. Many times the faculty eat lunch together in this laboratory, which allows for discussion of teaching problems or student concerns. Departmental camaraderie develops here and conversation often turns to the other broad interests of the faculty.

"we encourage teachers and not checkers on the clinic floor"

In clinic assignments, a one to six ratio of faculty to students is maintained. Department members are encouraged to be teachers and not checkers on the clinic floor. The opportunity for teaching in the clinic with the "one on one" situation should not be overlooked. The faculty is constantly trying to develop better techniques to take advantage of this stu-

dent contact. The student is questioned as to his intentions and the problems he might encounter so that positive steps can be taken to assist him. By the faculty's own efforts and by using such materials as Project ACORDE tapes, a series of single-concept TV tapes has been developed. These tapes run eight to ten minutes and are available in special audio-visual cubicles adjacent to the clinic area and in the school library. If the student doesn't seem to understand some principle of cavity preparation or restoration, he is asked to review the appropriate TV tape before continuing with the procedure. This is a new project and is being used heavily in our first-year course. The utilization of these tapes will be enhanced as time passes and both students and faculty become acquainted with this teaching technique. Here again the school's administration has spared no expense and has given much support to our efforts.

ROLE MODELING

Unfortunately, in dentistry it is difficult to teach by role modeling, but it is important to do so. The students seem to know that the operative faculty wants them to learn and that more is involved than just a grade for preparation.

The students know that all the full-time faculty have had experience in private practice and like to discuss situations in that light. The students need to see that the faculty are dentists that have become educators for the students' benefit. Sometimes a description of a past failure or success by the faculty will provide a practical example of an important concept for the student. The humanism of this approach will help a student establish his own ideas about the profession and perhaps help him appreciate the academician even more. Dental faculty should make every effort to use role modeling as a teaching mode whenever possible.

COMMITTEE ACTIVITIES

Someone has asked how I find time to serve on the Executive Committee of the American Association of Dental Schools and on the Council of Dental Materials and Devices and direct an operative department at the same time. It is a result of many facets of support within the school of dentistry, ranging from encouragement by the dean to understanding by the faculty. When any department member is away his lectures are given, clinic is covered, and there is no lessening of effectiveness toward the students. One faculty member is left in charge when the department head is away and the operation continues to be smooth. The only problem is the fear that someone will notice how nicely things operate when the department head is gone!

"students like to discuss situations with faculty in the light of practice experience"

The dean knows that much is to be gained by having faculty participate in state and national committees and councils. It is good for the institution to have its name listed in programs and publications. It helps in recruiting faculty and probably has an effect on student enrollment, especially at the graduate level. The departmental faculty are enriched by the experiences that are shared, and gain insight into the functions of other aspects of a dental society. A sense of contribution can enrich a whole department and with that in mind, an occasional extra assignment is accepted readily. Faculty like to be busy, but they like to know they are appreciated for their efforts.

PREPARING FOR PROMOTION

The members of the operative faculty understand that they are expected to become full professors and need to build curriculum vitae that will support that effort. At various times all have presented table clinics, produced TV tapes, or published articles. Three members of the department have master's degrees in education, and a fourth is currently participating in our master's program. We have yet to produce any clinical research but it is planned for the future. Most of the faculty have unassigned time that could be used for research, and those who are interested could be incorporated into a research program. Be-

cause of a lack of expertise in clinical research within the department at this time, a conjoint effort with the department of biomaterials is being established.

If encouragement alone will not strengthen the individual's curriculum vitae, projects are discussed which appeal to that individual and assignments are made that lead to the fulfillment of those projects. This can be done singly or in groups.

Except for a minimum, the element of time does not qualify a candidate for promotion. The faculty member must understand that when he is deemed qualified by the department head, his curriculum vitae will be submitted through the proper channels and his chances for promotion will be excellent. The importance of time needed for student involvement in clinical teaching is stressed to those members of the Appointments and Promotions Committee who represent the basic sciences. Such understanding is imperative for proper recognition of clinical faculty and their endeavors. Candidates should not be submitted for promotion until the department head is satisfied that he or she is a strong and viable candidate. This attention to detail results in success, harmony, and respect for all involved.

ADMINISTRATION VS TEACHING

It seems that each administrator must come to his own decision about direct participation in the teaching program. Undoubtedly this will be influenced by the school, the curriculum responsibilities of the department, the size of the faculty, and by the administrator's preferences. Personally, I enjoy teaching and continue to be a course director, a pursuit that involves lecturing and teaching in the preclinical laboratory. I am also assigned in the second- and third-year clinics. It may be that a stronger department could be developed if another full-time equivalent were used to remove some of the student contact load from the department head. But, it may be that student contact gives the department head the added insight that enables him to be a more complete administrator. Student contact on the part of the department head may well result in better performance by his entire faculty, improved teaching throughout the department, and a rapport and respect from other departments within the school. The ultimate decision should be made by the dean, who should make it clear whether he wants pure administrators as department heads or if he desires teachers to chair his departments. Louisiana State University School of Dentistry has teaching administrators, a combination that appears to be a strength and not a weakness.

"LSU combines teaching and administration—a combination that appears to be a strength and not a weakness"

In closing, permit me to point out that little if anything is accomplished by the individual. It is fortunate when a department head has understanding and support from his administrators and a warmth and companionship from within the department. Team effort produces success, and I'm thankful to be playing with a winning team.

PART 2: THE NEED FOR GRADUATE EDUCATION IN OPERATIVE DENTISTRY

OPERATIVE DENTISTRY, SUPPLEMENT 2, 1981, 18-24.

The Need for Graduate Education in Operative Dentistry

MELVIN R LUND

When the occasion arises to assess the impact of a person, an educational institution, or a profession, the initial procedure is to step back and place the situation into its historic perspective.

Since our intention is to study the impact or potential impact of graduate studies within operative dentistry, it is pertinent to focus on some of the milestones from antiquity to the present to determine the identity of our heritage and the quality of our performance. From such a picture we can judge our working level of today and relate realistically to current issues.

A LOOK AT THE HISTORIC PAST

Sumerian clay tablets tell of dental cures, as far back as 5000 BC, based on religious beliefs; we know that Chinese practitioners used acupuncture to cure dental ills in 3000 BC; Egyptian papyrus discloses specific remedies for tooth problems in 1550 BC. By today's standards their knowledge was crudely based; yet early dental instruments were surprisingly modern in design.

During Moses' time the code of justice stipulated that if a man "smite out his manservant's tooth, or his maidservant's tooth; he shall let him go free for his tooth's sake" (*Exodus* xxi:27). The loss of a tooth was considered sufficiently important to command reparation.

We recognize that from New Testament days myrrh was one of the recognized spices and of great value. It was also used as a base for mouthwash so that, according to the Latin poet Martial, "the breath of your mouth may not smell from yesterday's wine." And according to Secundus (Pliny the Elder), who died with Pompeii, wine should be used as a mouthwash before retiring.

During the time of the Romans in the first century AD there were remedies, extractions, and prosthetic devices, but unfortunately, after the fall of Rome and during the Dark Ages little progress was made medically or dentally except for fillings and extractions.

Not until the 9th century do we have records of fillings, when under the rule of the caliphs the Persians used a cement-type filling of mastic and alum. In the 15th century Professor Joannes Arculanus, in writing that "a cavity may be filled in the ordinary way with leaves of

Indiana University School of Dentistry, 1121 West Michigan Street, Indianapolis, IN 46202, USA

MELVIN R LUND, DMD, MS, professor and chairman of the Department of Operative Dentistry

"for seven years the dental apprentice was forbidden to marry or play cards"

gold," confirms the general evidence that the filling with gold was common to practice in Italy at that time.

The separation of dentistry from medicine and surgery came about slowly, initiated by the great Italian anatomists of the Renaissance who based their writings on actual dissection of the human body.

MODERN DENTISTRY: THE 18TH CENTURY

The beginnings of modern dentistry were initiated in France by Pierre Fauchard, who began dental practice in 1715. His filling materials were tin, which he preferred for its adaptability to the tooth, lead, and gold, which he preferred least because it was difficult to use.

When in 1757 Jacob Schaeffer wrote a book to disprove the presence of worms in the teeth, Fauchard concurred, thus disposing of the centuries-old theory of worms as a cause of decay, and introducing the term 'dental caries'. Even so, this ancient belief persisted into the middle of the 18th century and is still believed by some primitive peoples today. Fauchard, called the 'Father of Dentistry', made significant contributions with the publication of two volumes devoted exclusively to dentistry (1728) and his separation of dentistry from the practice of surgery.

Individual dentists learned their profession through apprenticeship, a system that continued through the 1800s while education was gaining stature. It was stipulated that a person serve as a dental apprentice for seven years. During this seven-year period he was forbidden to marry or to play cards. He was required to spend some time with a jeweler, and asked never to divulge professional secrets.

The first dentist in colonial America was Robert Woofendale from London, who practiced in New York and Philadelphia from 1766 to 1768, returned to London and practiced again in New York as of 1795. Other dentists are on record from this date as well, with a notable influx and subsequent influence of trained practitioners from England and France during the Revolutionary War.

While Britain lagged behind the United States in establishing dentistry as a separate profession, that country along with France provided the essential medical, surgical, and scientific training for dentists who came to the United States.

For the United States, the years between 1830 and 1840 were crucial in the structuring of American dentistry. Its autonomy as a profession was determined with the founding of the Baltimore College of Dental Surgery in 1840, the first dental school in the world, which conferred the DDS degree. Important names were connected with the College: Hayden, Baxley, Bond, Harris. Chapin A Harris also helped found the first dental society and became the editor of the first dental journal (*American Journal of Dental Science,* 1839). His *The Principles and Practice of Dental Surgery* was the standard for many years.

In 1844 Samuel S White, DDS, founded the S S White Dental Manufacturing Company and was first to begin the proprietary dental periodicals, a milestone in service to the profession (*Dental Cosmos,* 1860).

"the years 1830 to 1840 were crucial in the structuring of American dentistry"

Twenty years after the founding of the Baltimore College, the American Dental Association was organized, to become instrumental in the establishment and quality of dental education. In 1883 the National Association of Dental Examiners was formed to determine fitness to practice. Dental journals, dental societies, and a variety of dental organizations sprang up and flourished in the United States. In England dentistry was at last established as a separate profession in 1878.

But all was not an unswerving path to success. In 1830 the Crawcour brothers from France introduced to New York "Royal Mineral Succedaneum" as a substitute for gold. Their

"in 1843 anyone who used amalgam would be guilty of malpractice"

mixture of silver coin and mercury was exploited to the detriment of patients, and before long the threat of mercury poisoning became a heated issue. In 1843 the American Society of Dental Surgeons established a pledge that anyone who used amalgam would be guilty of malpractice and would forfeit membership in the organization. The internal conflict that followed led to the eventual demise of the Society. The "amalgam war" was officially ended in 1850.

Among a growing list of technical improvements was the introduction of the rubber dam in 1864 by S C Barnum to provide isolation of the tooth, a major contribution to the success of operative dentistry. Dr Barnum could have made commercial gain from this invention but chose not to do so. His idea led to a refinement in the use of gold and greatly expanded its utilization. He received quick recognition for his contribution, a courtesy our profession has frequently overlooked over the years.

THE TECHNOLOGICAL DECADES

From 1870 to the present many contributions have added to the technical improvement of operative dentistry. The shell gold crown and the Richmond crown were introduced. Zinc oxyphosphate was made available and local anesthesia became a reality though the drugs would require refinement for many years forward. The invention of the foot engine and electric engine became an obvious boon for the preparation of teeth and it became feasible to provide crown and bridge treatment. Dr Charles Land developed and presented information leading to the making of porcelain jacket crowns. Dr J Foster Flagg began the effort to make dental amalgam respectable.

Many individuals over a long period of time have contributed to the progress and stature of operative dentistry. But if we wished to specify one who deserves a particular recognition during the past hundred years it would be G V Black. He came very close to choosing to become a physician but in 1856 he was attracted to dentistry. He entered an apprentice arrangement for a few weeks and then began practice in the town of his birth. Although his formal education was very limited, he taught himself in several disciplines including languages, basic sciences, and metallurgy, and as a dental practitioner.

His research and literary efforts on behalf of dentistry are of monumental consequence and more than any other person he has had the greatest influence upon the progress of dentistry. His efforts included patient care, research, influential education, and prolific writings. He was responsible for improving the technical skill of the average dentist.

"if we were to name one person during the past hundred years it would be G V Black"

His first presentation to a dental audience was under the title "Gold Foil" in 1869. One of his fruitful endeavors in research was to bring a desirable level of reliability to dental amalgam, for by 1895 he had devised a balanced amalgam. By this time the dental amalgam had become popular with the dental profession because it was easy to handle and inexpensive. Yet it provided very poor clinical results and the manufacturing processes were erratic and empirical.

Dr Black developed an amalgam hard enough to withstand the forces of mastication and that did not expand or contract. This formulation became the standard for dental amalgam. Somewhat by accident but as a result of meticulous observation by Dr Black the beneficial influence of heating or annealing amalgam particles was discovered. This corrected the obvious bad behavior of fresh cut dental amalgam filings.

Part of Dr Black's fame came as a result of the method he established for preparing cavities. His observations indicated that all teeth were subject to decay but that in the areas that were self-cleansing there was less decay. He advocated placing margins into areas of comparative immunity, which became the basis for the principle of "extension for prevention."

"Dr Black did not achieve successes quickly but by consistent, prolonged effort"

This principle became a dominant factor in operative dentistry worldwide and its influence has an impact at the present time. This is not to overlook the fact that this hallowed principle has been under scrutiny for several years and the application has shifted.

To complement his method of cavity preparation, Dr Black began working out the design of cutting instruments and excavators. The instruments that he designed are being manufactured for use in today's practice of dentistry. While he designed many instruments, he regarded the 'Arkansas Stone' as most important. His choice suggests that he thought unless the instruments were sharp they were of limited value. This appears to have become one of our problems today, for most students do not have proper regard for the degree of sharpness in their hand instruments. And even beyond this, the ability of the dental practitioner is declining.

Dr Black did not achieve his successes quickly but by consistent and prolonged effort coupled with his innate skill and intelligence. He appeared not to possess any of the idiosyncrasies which frequently characterize great people and his honesty and his genial and unselfish personality drew people toward him in bonds of friendship.

On January 15, 1907, Dr William Taggart in New York presented a method of making dental castings. The capability of making restorations of cast metal provided immediately an additional means by which patients would receive quality treatment. This process, involving the lost wax pattern, has been refined through the intervening years with much of the focus on the investment material.

The value of this contribution is beyond estimate and it is unfortunate that an element of tragedy is associated with it. There is controversy regarding the legitimacy of Dr Taggart's claim of originality, as others contend that there are those who preceded him in revealing this process. It is true that the process of parts of it were known earlier by some. The point that was unique was that Dr Taggart made a cast restoration that fit a dental preparation.

The scenario that follows is one of frustration, bitterness, high emotion, and court battles, which dealt with possible patent rights. Dr Taggart developed visions of financial rewards as a result of his invention but the dental profession resisted paying for the privilege of using such a procedure. Freedom from such restrictions was the proper position in these circumstances; however, had Dr Taggart been able to go into the manufacture of casting machines the profit from such a venture would not have raised a question.

It appears that Dr Taggart contributed to his own difficulty and perhaps accepted poor advice. After the litigation Dr Taggart spent his aging years in bitterness, remaining withdrawn from his profession until he died in poverty. It is ironic that at the same time many dentists were financially quite successful and could trace their success to the contribution of Dr Taggart.

It might be thought that by 1915 dentistry would be quite an enlightened profession but looking into a crown and bridge text of the day might bring some doubts. Here we find this statement: "It was quite a step forward when the profession recognized that the pulp was a formative organ and when its work was done, it was no longer necessary to the life and health of the tooth" (Peeso, 1916). It was also suggested that a nonvital tooth had little potential for causing problems.

"by 1915 dentistry was not entirely an enlightened profession"

But other voices were saying that too many pulps were being destroyed despite the availability of better treatment. Gold was the restorative material recommended for anterior teeth and amalgam could be used but with reservations.

Fillings were thought to effect cures from dental decay if they could shut everything away from the dentin. It was advocated that they should be alcohol tight, for alcohol would enter where water could not. At the moment there

"graduate curricula begun in 1940 established the specialties, which were quite secure a decade later"

are several standing by with research protocols, hoping to bring additional light to the problem. One of the difficulties with this research is locating an adequate population for controls.

One whose influence extends into very recent times is Dr George Hollenback. Several of us can recall our conversations with him and can identify his strong interest in operative dentistry, beginning as he left dental school in 1909 for a small-town practice in Montana for ten years and on to a sophisticated practice in Los Angeles.

He was constantly expanding his knowledge as he continued his practice and he would willingly share information with his colleagues. His level of interest is unique in that near the age of 60 he stepped aside from his practice and fulfilled the requirements for the master of science degree at Northwestern University with Dr Eugene Skinner. He spoke of this time in his life with great enthusiasm.

In an article titled "The Most Important Dimension" (1961), Dr. Hollenback notes that "a well educated dentist need never apologize for his calling. It is incumbent upon him to be observant, thoughtful, studious, and to seek further knowledge from all available sources, thus equipping himself to fulfill better his obligation."

THE MOVE TOWARD GRADUATE EDUCATION

The beginnings of graduate work in dentistry came in 1940, with the opening of an Institute for Graduate and Postgraduate Dentistry at the University of Michigan by the W K Kellogg Foundation. Here graduate curricula were begun to establish the specialties of periodontics, pedodontics, endodontics, and crown and bridge prosthetics. By 1950 these specialty trends were quite secure.

It quickly became apparent that teachers in the specialty disciplines were coming from graduate education and this led to justification of graduate dental education. But operative dentistry, which by tradition had held center stage in dental education, was threatened by the loss of its time to other disciplines, some of which was justified.

SPECIAL PROBLEMS FOR DEPARTMENTS OF OPERATIVE DENTISTRY

One of the reasons for the decline in emphasis was that very few teachers of operative dentistry had training beyond that of undergraduate dentistry and private practice. It is very likely that the teachers in competing disciplines, because of advanced education, were able to overshadow and overpower those working in operative dentistry. This has led to problems with identity and to feelings of insecurity among the teachers of operative dentistry.

The lack of a base from a specialty organization within operative dentistry has resulted in a minimum of activity toward graduate education. Dental school administrations were thus

"specialty education began to overpower those working in operative dentistry"

able to overlook an obvious disparity in the training of the faculty. Some operative departments were sustained by the personal charisma of their faculty, or the remnants of long-standing tradition. The lack of demand for graduate education in operative dentistry has resulted in an extremely limited number of places where such education can be obtained.

This is not to suggest that all operative teachers need graduate education, but it would improve the quality of operative training if a representative number of the full-time teachers were to complete a program of advanced studies. The teacher with graduate training will tend to approach the teaching of undergraduate students in a different style from those that are not thus trained. He will not feel as threatened by the questions that are raised and will admit that he doesn't have all the answers. Some teachers who feel less secure will try to resolve issues by expressions of authority.

"research has a remarkable and long-lasting influence on the life of a student"

The teacher who is primarily secure in practice can decide to eliminate academics at any time. But the teacher with graduate education will be inclined to look at the long-range effects and will have goals which provide a positive influence in his teaching.

THE INFLUENCE OF RESEARCH

Research is most productive when done by those who enjoy doing it, have a background that allows them to be efficient and to proceed in a logical manner. It is helpful if they seek and accept advice from those who have a background in research. Training is needed to collect and interpret data effectively.

Those who enter graduate programs do so knowing that one of their educational benefits is to participate in research. A significant number of the research reports which consistently appear in the literature are as partial fulfillment of their educational objectives.

Research has a remarkable and long-lasting influence on the life of a student. Research requires self-imposed discipline and when completed the student has achieved a deserved level of satisfaction.

INFLUENCE OF GRADUATE STUDENTS ON UNDERGRADUATE PROGRAMS

A strong implication is left with undergraduate students that operative dentistry is exclusively a mechanical discipline, although over the years such a concept has been repeatedly shown to be false. Over 50 years ago Dr John E Gurley said that he felt the young people in schools of that time had reached a higher level of education and maturity compared with prior years. "This is a day when man with present methods of learning demands to know the 'why' of an issue" (1940). If that observation was accurate then, perhaps we have lost ground during the intervening years. In my opinion many undergraduate students are not interested in exploring logic and reason.

I have heard undergraduate students ask: "Why would you possibly wish to work toward a degree in operative dentistry?" Somewhere we did something wrong if we have left the impression that there is nothing of any consequence to learn after the technique laboratory. Such an attitude does tend to promote the idea that we are providing technical training exclusively. Now admittedly if I were seeking treatment I would feel more comfortable with a practitioner that has good technical ability and training than with one who has the theory well in hand but demonstrates poor technical performance. Vernetti (1980), with agreement from many, states there has been a tendency to minimize the importance of craftsmanship. So the obvious concern is to blend a mixture of good theory and good performance.

Any dental school must establish a good basis in operative dentistry to provide a solid foundation for the education that follows. Any-

"the obvious concern is to blend a mixture of good theory and good performance"

one believing that excellence can be achieved in other dental disciplines without having established quality in the program of operative dentistry is proceeding with a definite handicap.

If a school demonstrates a concern for excellent theories but disregards good plumbing it can easily achieve a situation wherein neither the pipes nor the theories will hold water.

If the graduate program is actively related to the teaching of undergraduate students, the influence is positive. For many times the graduate student may become a one-on-one teacher to an undergraduate student. It is very effective when a student allows a graduate student to lead him through a procedure. Undergraduates feel more at ease in discussions with fellow students, and more learning with less frustration is the result. The potential for this approach is limited because of the small number of graduate students, but it is important to consider its inclusion in every graduate program.

"my own affiliation with a graduate program has been very rewarding"

IN CONCLUSION

Progress is measured by first evaluating our past performance. So we have portrayed a partial view of dentistry with emphasis on that which has a direct bearing on operative dentistry. We have looked briefly at a few of the individuals whose shadow has been effectively cast over our path.

Our thoughts center on our concern for graduate education for operative dentistry. My personal experience of affiliation with a graduate program has been very rewarding. The benefits are evident both for the individual student and for the undergraduate students who are in direct contact.

Since we began with a biblical reference I would like to conclude from the same source. Jeremiah seems to express a level of frustration, ancient and current, when he says in *Lamentations* (iv:1): "How is the gold become dim! *how* is the most fine gold changed!"

Perhaps a statement by Isaiah (lx:1) may be the solution and have dental implications where he says: "Arise, shine; for thy light is come."

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Current State of the Art of Operative Dentistry

JULIAN J THOMAS, JR

The need for operative dentistry therapy continues to be the prominent demand on the time and efforts of practicing dentists throughout this country. Two studies, recently carried out by the US Navy, have documented the prevalence of dental caries in young men and women entering the Navy and Marine Corps. In a survey of all recruits entering training during an eight-month period, Spinks and Schneider (1979) found that the average individual needed five restorations. This survey utilized a 10% sample of both males and females between the ages of 18 and 26 from all parts of the country. Similarly, Cecil and Wirthlin (1979), surveying the recruits reporting to Great Lakes, found an average of 6.5 decayed teeth per individual. Each of these carious teeth would undoubtedly require one or more restorations, thereby indicating a significantly higher need for operative dentistry than the previous study.

The larger requirements found in the Great Lakes study are probably due to the geographic differences and sexual make-up of the two populations sampled. The Great Lakes survey included only young males from the Northeast and Midwest, whereas the other was a broad sample of the country as a whole.

GROWTH OF OPERATIVE DENTISTRY

While the treatment requirements for operative dentistry remain high, this discipline has not remained static. During the past 20 years there has been an explosive growth in the knowledge and technical aspects of operative dentistry. This was initiated by the development of the high rotary speeds which, in turn, stimulated a vast amount of study of the pulpal response to operative procedures. More recently, restorative materials have been intensely studied with a resultant development in new materials and the improvement in the physical properties of others. Restorative techniques, such as pin retention, conservative cavity preparations, and marginal seal have received

Naval Regional Dental Center, San Diego, CA 92136, USA

JULIAN J THOMAS, JR, DDS, MSD, Rear Admiral, Dental Corps, United States Navy; Commanding Officer, Naval Regional Dental Center, San Diego

the attention of investigators and clinicians. Occlusal function continues to receive the close scrutiny of many clinicians and, although there is not widespread agreement on methodology and philosophy, there is a large amount of proven knowledge and technology available. The cause of dental caries is now well understood and effective measures of prevention are readily available.

Fluoridation

Today it is possible to virtually eliminate dental caries through the fluoridation of water supplies, topical application of fluoride solutions, plaque control, and dietary counseling. The use of such preventives and care is almost entirely dependent on the foibles of local governments and the concern and motivation of the individual patient. Since these factors are unreliable, the dental profession needs to continue in its efforts to restore teeth damaged by caries.

Copper-rich Amalgam Alloys

Extremely durable posterior restorations can be made from the new copper-rich amalgam alloys that are inserted in conservative cavity preparations. The marginal seal is excellent because of the significantly improved physical properties of the alloy, the use of liners, and the deposition of products of corrosion between amalgam and tooth. Badly broken down teeth can be restored with amalgam using threaded pins to enhance retention. These pin-retained restorations can either be used as a core for a casting or serve quite adequately as the final restoration.

Cast Gold Restorations

Cast gold restorations in selected cases can provide strength, good marginal seal, and restore or improve occlusal function. This is made possible because of more precise laboratory techniques, better luting agents, and improved knowledge of occlusion.

Cohesive Gold

Cohesive gold is now available in many forms. In selected cases, this material provides an ideal and very practical alternative for restoring discrete lesions.

Esthetics and the Composites

When esthetics is a major consideration and occlusal forces are minimal or nonexistent the composites offer a sound alternative. An effective seal can now be achieved with these materials by etching the enamel to provide a mechanical bond. In those cases in which both esthetics and strength are important the ceramo-metal restorations are excellent choices.

All of these restorations can now be placed with only minimal pulpal response by using high speed with adequate coolant and properly placed intermediate bases.

QUALITY OF PRACTICE TODAY

Unfortunately, all the potential advances in operative treatment are not generally realized at this time. In order to fully appreciate the quality of operative dentistry currently practiced, one must examine a large number of treated patients from all over the country. This can readily be done by observing the existing restorations in the mouths of the thousands of young men and women entering the service each year.

The five training centers for recruits to the Navy and Marine Corps process approximately 130,000 new recruits from throughout the country annually. Initial examination of these young people reveals numerous deficiencies in operative treatment. The most commonly noted are:

- Badly abraded posterior composite restorations with loss of centric stops and interproximal contacts. It is well documented that these materials cannot withstand the stress of occlusal forces and are therefore not indicated in these situations.
- Poorly contoured restorations of composite and amalgam, restorations of cast gold with overhangs, recurrent caries, and so on.
- Faulty restorations due to poor cavity preparation.
- Faulty restorations due to lack of care in

handling and manipulation of the restorative materials.

Experience Level of Recent Graduates

Another indicator of the quality of operative dentistry as practiced today is the level of experience of recent graduates of the dental schools of this country. The Navy Dental Corps annually commissions between 200 and 250 of these individuals. While the range of proficiency of most graduates varies from the well prepared to the barely adequate, some general observations can be made.

It is not uncommon for these new dental officers to report to their first duty station with less experience and fewer clinical skills than would be expected. *Many* have never used retentive pins in an amalgam restoration. *Many* have never restored a tooth with direct gold. *Most* have difficulty with rubber dam isolation. Materials handling and choice of materials are *often* abused and *frequently* careless. Adverse pulpal response is oftentimes caused by abusive techniques and ignorance of the potentially traumatic effect of tooth preparation and restorative procedures. Many have difficulty in formulating an overall treatment plan because of their tendency to devote their attention to one tooth or a small group of teeth.

Naturally, the most disturbing observation concerns the least prepared recent graduates. This is, admittedly, a relatively small number of individuals, but their level of experience and ability is shocking. The Navy has commissioned several of these persons in the past two years. In order for these young doctors to be allowed to treat patients it has been necessary to provide very basic training. This included teaching anatomy for local anesthesia, class 1 and 2 cavity preparations on ivorine teeth, finger rest positions, and other lessons of sophomore technique using mannequins and typodonts. Fortunately, after several months of personal, one-on-one training they were able to be used in treating patients, and be qualified to stand the duty. This serious inadequacy is not unique to the Navy. Recently a candidate for the state board in Oregon performed his first class 2 restoration on that state's certification examination (Gibson, 1979).

The correction of these serious deficiencies must receive the highest priority from everyone concerned. Operative dentistry is the nucleus of the practice of dentistry and continues to be the predominant need of the patients we serve. It is inconceivable that the recent explosion of knowledge in this area would be accompanied by an implosion in the portion of the dental school curriculum devoted to operative dentistry. This must be reversed—now.

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The Impact of a Graduate Program from an Administrator's Point of View

JAMES H McLERAN

As one reviews the literature of operative dentistry over the past several years it is clear that many of you have growing concerns about the relative emphasis on and status of operative dentistry. Included are concerns that specialist types in administrative positions have little appreciation for the need to have dental graduates well founded in operative dentistry; concerns that students and therefore new graduates lack adequate competency in operative skills and know-how; concerns that operative dentistry is being de-emphasized and short-changed in the curricula of most schools; and a basic fear that high quality operative dentistry is beyond the perception of most graduates to the point that many wouldn't recognize a quality preparation or restoration if they saw it!

In the same literature I find evidence that there may be a debate within your ranks about encouraging career faculty appointed in departments of operative dentistry to earn such academic credentials as a master's degree or comparable certification of formal graduate study. Wow! If an appreciation of the need to prepare oneself to at least play the "game"—in this case the university's game—is *not* agreed upon, then I think you have trouble!

I'll make it clear from the start that I feel graduate programs, graduate studies, and all other legitimate academic credentials are very important to the success of the individual, the department and its programs, and the institution. I've been asked to give an administrator's view of the impact of a graduate program. One might interpret that a consensus exists on the administrator's viewpoint. I shan't make that assumption; rather I will speak for myself only.

Since I brought up credentials, I would assume you would have preferred a confirmed administrator with intimate knowledge and experience of education in operative dentistry. I claim neither. Professionally, I am a dentist first, all right. Secondarily, I am an oral surgeon who currently spends part time trying to use those somewhat rusty surgical skills as often as possible, while spending most of my time as an amateur administrator. My operative pedigree consists of an undergraduate educa-

University of Iowa, College of Dentistry, Iowa City, IA 52242, USA

JAMES H McLERAN, DDS, MS, dean

"the quality and content of the course of study is of first importance"

tion from a faculty that I just *knew* were direct descendants of G V Black; a traumatic 16 months on the "amalgam line" under a tyrannical Navy captain; and, most importantly, the past 17 years at two universities working with and observing the likes of Wally Johnson and Cliff Sturdevant. Although their modus operandi couldn't be more in contrast, they are two of the most dedicated and effective dental educators I have ever known. At any rate, I may be short on credentials, but I have plenty of opinions—as do most deans—and particularly about graduate programs.

The path I would like to follow will touch on graduate programs in general; uniqueness of graduate education in operative dentistry; common characteristics of good programs; the impact of such a program on the institution, the department, and the discipline; and finally, some general observations about the discipline of operative dentistry, which may not be germane to the topic but which I feel compelled to share with you.

IMPACT OF GRADUATE DENTAL PROGRAMS

For the sake of this discussion I have taken license to use graduate education and graduate programs in the broadest sense rather than limiting it just to degree programs. In fact, whether the recognition is given in the form of a master of science, professional master's, or a certificate is of secondary importance to the quality and content of the course of study.

Although the first program in graduate dental education was established in 1894 at Michigan, evolution of graduate education was slow and didn't really gain momentum until after the second World War. As of 1978-79 only seven programs, with a total enrollment of 37 students, were listed in operative dentistry. Three years ago there were four programs and 16 students.

Not only are graduate dental programs in a relatively infant stage, they are often unjustly viewed as anomalous in the university. And I'm not sure why. Within the university there are many other graduate programs that don't fit the classic model of higher education, including fine arts, law, communications, engineering, and medicine. In my opinion we tend to be defensive about graduate education in dentistry when I don't feel we need to be. We should state clearly the objectives of our program, establish requisites, define terminal goals, carry them out as well as we can, and then view the whole with pride.

We tend to be very hard on ourselves when judging the appropriateness of certain aspects of our program. This is hypocritical and self-defeating. For instance, do graduate students necessarily have to have the same role as our predoctoral students? Isn't there a legitimate reason to require service and teaching as part of a graduate student's program? Programs of advanced education throughout the university require students to participate in service and

"graduate students in dentistry have meaningful roles in teaching, patient care, and service"

teaching as students, as teaching assistants, as research assistants, as fellows, and as house staff. As an administrator I vigorously oppose abusive extremes, but I do feel graduate students in dentistry have meaningful and educationally sound roles to play in teaching, patient care, and service commitments which should be built into their programs. While we espouse the educational and research (that is, academic) goals, we often minimize the service goals. In reality the service functions must exist for the academic goals to be realized. If one can't accept this philosophy, then I think the chances of having a successful program are greatly reduced.

As an administrator I find a number of compelling reasons to support graduate programs in dentistry. They are common to all programs and include the following:

"the very presence of graduate programs in an institution enhances the quality"

- **Enhancement of the Quality of the Predoctoral Program**

The very presence of graduate programs in an institution enhances the quality of the predoctoral programs. I am convinced that when kept in balanced perspective and integrated, graduate and predoctoral programs are complementary and supplementary.

- **Production of a Pool of Faculty**

By far the paramount justification for a graduate program is to produce a pool of quality faculty with academic credentials. And I mean production in the generic sense, not just for local provincial consumption. I say that because it is to everyone's benefit for the educational arm to remain vital—not because of any serious concern over inbreeding. The hazards of inbreeding have been exaggerated, in my opinion. My experience leads me to believe that faculty who would become mired in dogma will do it no matter how many institutions they grace. My primary concern is that we recruit and develop for each other. I am delighted when graduates of our programs show interest and aptitude for an academic career, no matter where they go. If they leave for another institution when we need them, I cry a lot, but all in all I'm pleased.

- **Recruitment and Retention of Faculty**

Attracting and retaining high quality faculty is certainly facilitated by the challenge of teaching and conducting research with graduate students. Quality faculty may not produce quality programs if other resources are marginal, but there is no chance to have quality programs without them. Faculty are to administrators what athletes are to coaches: they're the meat in our meatloaf; they're the bread in our sandwiches. (Please don't quote that last statement out of context to my Iowa colleagues.) Not all exceptional faculty desire direct contact with graduate education. Many do, however, and the rest benefit by the other advantages.

- **Promotion of Research**

Graduate programs enhance research efforts and I am convinced that research programs stand little chance in their absence. There are those who are cynical about the quality of research projects of graduate students. I think they really miss the point. No claim is made that many, if any, dental graduate students will be invited to become donors for the "Hermann J Muller Repository for Germinal Choice" in the near future, but their efforts bring enormous benefits to faculty and the institution, in addition to their own experience.

- **Promotion of Learning**

Thriving graduate programs are instrumental in creating an atmosphere in the institution that is conducive to learning. The quality of the institutional atmosphere ranks only behind the quality of faculty in determining the success of

"the atmosphere created by graduate programs affects the caliber of faculty and students"

a department or an institution. In fact, I contend that this atmospheric quality often has a major bearing on the caliber of faculty and students attracted to the program or school. Having the two-way challenge and stimulation between graduate student and faculty can be an electrifying phenomenon affecting all, including predoctoral students and auxiliary staff as well.

- **Broadening Scope of Patient Care**

Graduate students complete the patient-care delivery team of a department. As our institutions become more oriented to the care of patients, as I believe they must to survive in the times ahead, the widest possible spectrum of services for patients will be expected of us. If we are truly committed to comprehensive care for all patients, there must not be voids in care due to lack of expertise, economic barriers, or limitations of time. Even if a department has provisions for faculty practice, some needs of

"graduate students can be effective instructors of their own recently mastered techniques"

patients will go unmet because of lack of faculty time, inability of patients to pay, or the lack of suitability for predoctoral education. Even then, if all patients are accepted for treatment, some institutions will supplement the service delivered by faculty, graduate students, and predoctoral students with service clinics staffed with salaried clinicians.

- **Supplementing Teaching**

As a valid educational experience, graduate students supplement the teaching of predoctoral and auxiliary students. Graduate students can be very enthusiastic and effective instructors of content and technics which have recently been mastered. Being questioned by other learners, such as the predoctoral student, can be a great stimulus to learning also.

- **Attracting Department Chairpersons**

From a dean's point of view there is another important benefit to having a graduate program in existence or in the plans. It greatly enhances the attractiveness of a departmental chairmanship. I was once advised by a close friend and former dean of mine that the most important thing a dean does is to appoint search committees. My experience validates that advice. Chairpersons are pivotal in academia. They are both faculty and administrators; they set the tone in their departments and collectively in the school; they either attract or fail to attract the most important resources of the department; they must make decisions; they must lead; they must be program-oriented but within the goals of the institution; and we hope they are smart enough not to covet the dean's job.

The importance of the chairperson has certainly not escaped you, for I noticed considerable discussion of this in your literature. There was some debate over whether this person should excel as a clinician or as an academician. I'm not sure that those characteristics are mutually exclusive (though I'll admit the combination in one person is scarce), nor am I convinced those characteristics are the critical qualities. The curriculum vitae is of secondary importance to me—in fact if it is disproportionately long on first-author or single-author publications, I become wary. Why? Because I am convinced that the essential qualities are leadership ability, interest in others, appreciation for balance between teaching and research, and most of all an unselfish dedication to meet program goals and further the advancement of faculty and students. This person intuitively realizes that if the program succeeds, all associated with it including the chairperson, will also succeed. I find that to attract this caliber of person the challenge of a graduate program is important.

UNIQUENESS OF OPERATIVE DENTISTRY

Graduate programs in dentistry have many similarities, including the justifications just mentioned. However, they all have differences between disciplines and between institutions.

"the specialties develop specialists; operative programs develop faculty and research"

As an administrator I have differing expectations from these various programs. If we categorize them into specialty and nonspecialty programs, I can further distinguish those expectations.

In specialty programs the emphasis is placed on the education and training of superb clinicians. While my interest in development of faculty spans all disciplines, my interest in the research and teaching methodology elements of the graduate program only becomes intense when the need for faculty in that academic discipline is acute. Examples of that today would be endodontics, and to a lesser degree, periodontics.

In nonspecialty programs such as operative dentistry, my interest in the development and continued vitality of faculty is of paramount importance now and in the foreseeable future. To me that means graduate education. Where some specialty programs can get by with less

"the reality of academic life is that outside faculty cannot fairly compete for university recognition"

emphasis on research, operative programs cannot! Outside of the general benefits to existing faculty and the department, the primary purpose for their program is to develop teachers—not just ordinary teachers, but individuals with impeccable academic credentials that afford them equal opportunity to compete with and assume a stature comparable to all other university faculty.

The aforementioned advantages of having a graduate program apply, without exception, to departments of operative dentistry. In addition, your discipline is faced with some unique problems for which graduate education could offer at least a partial resolution. They include:

1. Faculty

Obviously, you are all aware of your unique challenge in this area as evidenced by your literature and the fact that you devoted your section program in Las Vegas in 1977 to the theme "How Long Can Operative Dentistry Survive without Faculty?" Having missed the keynote address (Terkla, 1977), I located it and found some very significant assertions. His survey revealed that most chairpersons of operative dentistry were not requiring experience in teaching, research training, or graduate degrees for full-time academic appointments. While this doesn't mean they didn't desire it, it does indicate to me that many faculty in operative dentistry are starting at a distinct disadvantage compared to their colleagues in other disciplines.

Terkla's survey also identified private practice and the military as major outside pools for faculty recruitment. As an administrator, I certainly don't rule out these two pools for potential faculty. However, I refuse to mislead any recruit to our faculty. The reality of academic life is that, in general, applicants from these two arenas often do not have the background to compete fairly for recognition and rewards in the university environment even though they may be superior clinicians and natural teachers.

I believe operative dentistry could benefit from the "golden chain reaction" ignited by quality graduate education. It goes something like this: graduate education leads to scholarly tools, which lead to investigative skills and motivation, which lead to rewards and increased resources, which lead to improved staffing, which leads to more developmental time for all, which leads to more recognition, which leads to more graduate applicants, who lead to more education, research rewards, resources, and so on. Sounds easy, doesn't it! Well, it is *not,* but I believe if I were in operative dentistry, I would make every effort to pursue it.

2. Research

Your plight in research is not so much unique as it is infinite. A perusal of your literature would lead one to believe that, considering the approximately 450 full-time equivalent faculty in the discipline, the research contributions are somewhat short of what you would like. I'm certain there are many causes for this, including a paucity of viable graduate programs.

"the need for research is true for all the disciplines in dental education"

Another factor one would glean from your thoughts is the prevalence of understaffing and excessive contact with students in operative departments. I do not question the validity of this assertion, but as an administrator I implore you to study it more closely. Is it really that disproportionate with other disciplines? It probably is in many schools. However, it definitely is not confined to this discipline. I believe we must reach the point where we accept this seemingly unfair situation as "par for the course" in dental education and realize it is probably to be with us indefinitely. There are ways it can be alleviated, including the previously mentioned "golden chain reaction," but it has to start somewhere. I submit that the

"if I were a chairperson I would do anything promising or legal to raise funds"

place to start is with a state of mind. Maybe you won't agree that is the place to start, but you must admit it is about the only place that doesn't cost money!

Because of the *way* we teach and *what* we teach, our situation is different from many other areas of the university. But must it be the burden that often it is asserted to be *unless* we want it to be? I suspect we sometimes use it as an excuse for a lack of scholarly activity. I'm sure I have. If we take an objective look at the vital, successful faculty in all areas of academia (including dentistry), we find that they are not locked into a 9 AM to 5 PM schedule. Much, if not all, of their professional growth activities have occurred after hours, on weekends, and during the times that clinics and classrooms are closed.

In our institution it used to be popular to point to the "light teaching load" of the medical faculty as viewed from student contact time. I spent a great deal of my early years on the faculty in day-to-day contact with medical faculty. I was one of the ones doing the pointing at first. However, in general I found them to be very busy people, who worked long hours with dedication and commitment. I find many of our most successful dental faculty have those same characteristics.

This whole arena is complicated by many interrelated factors, but I feel certain that a key to start unlocking our shackles will be graduate education and what it can contribute to our research efforts.

3. Funding

Once again your problem is more one of degree than of uniqueness. I daresay unlimited availability of funds would go a long way toward solving most problems you face. You could attract faculty with high salaries, recruit the best graduate students with competitive stipends, fund exotic research projects, and send the curriculum committee and the dean on a long, expense-free vacation.

A graduate program will not solve the funding dilemma. I'm not sure it complicates it much more, especially when one takes into account the contributions derived through services to patients, teaching efforts, and research productivity.

Many of my administrative colleagues will contend that graduate programs are the most expensive programs we sponsor. I am not convinced! The data used to assess efforts of faculty and costs of programs in dental education at all levels are variable, questionable, and so susceptible to various manipulations that I find it hard to justify dogmatic generalizations from it. It is true that costs per student and total size of operating budgets in schools with graduate programs are generally higher. It is also true that those schools have other characteristics that set them apart and these should be considered when assessing costs of programs. Such schools are usually more complex and have a wide variety of other programs including community, hospital, and research programs.

"the most effective way to attract young people to academics is through the role model of the faculty"

Funding is a problem for all and it won't be resolved easily. It must be attacked by the faculty and administration jointly. Every avenue must be explored to raise dollars to support young faculty and, we hope, graduate students. If I were a chairperson of operative dentistry, I would affiliate with hospital-related programs, seek traineeships, collaborate in geriatric programs, or any other promising and legal endeavor to raise funds. It seems clear that graduate dental education, as is graduate medical education, will be largely supported by income from care of patients. So I would become very dedicated to serving patients. The effort will eventually pay off!

4. Students

You do have a unique challenge in attracting quality applicants to graduate programs in operative dentistry. As I see it, there are several

"a successful graduate program would have tremendous impact on status"

reasons for this. Lack of specialty status and comparable incomes undoubtedly deter some who might be interested. The career path is more narrow in operative dentistry where most would be committed to teaching without the alternative of specialty private practice.

I believe the most effective mechanism for attracting young people to academics is the role model of the faculty. The operative department has a tremendous opportunity to affect the student for two reasons: the student sees operative dentistry as what dentistry is all about, and they usually have their initial clinical experiences there. Their image of the dental educator becomes fixed rather early. If that image is of one who is actively involved in care of patients, espouses a philosophy of comprehensive and preventive care, and shows an appreciation for research, the student will likely carry that image forward into practice. It might also have an impact on recruiting young people of quality to academic dentistry in general, and more specifically, the discipline of operative dentistry.

Lack of subsistence-level stipends in a discipline without perceived potential for high income is, I am sure, also deterring many. In our institution, operative dentistry is one of the departments where we develop young faculty by utilizing academic funds to subsidize their graduate studies. This is partly because their ultimate potential for income still lags behind "specialty" graduates, even within academics. It is also because of our conviction that academic skills and credentials are essential to their success in the academic environment and therefore the discipline. *And* success is what we want for them if we are to retain them.

5. Status and Identity

It seems clear that there is a perceived loss of status and concomitant blurring of identity in some schools for the operative disciplines. How much of this is due to the "good ol' days" philosophy and how much is valid is difficult for me to assess. My experiences have been to the contrary. Assuming this were a valid contention, a successful graduate program should and I believe would have a tremendous positive impact on the perceived status.

If a graduate program of quality were developed that led to the sort of benefits we have discussed, I believe it would affect the status of the department and the discipline in different but similar ways in different quarters.

At the interdepartmental level we have noted the positive impact it could have on the vigor and attitude of all personnel. There is little doubt that this would positively impact the predoctoral teaching programs as well. Students sense competency and confidence. High-caliber faculty and graduate students can trigger a gratifying surge of respect from the students.

At the collegiate level, quality of faculty will be perceived in a hurry. The perception is apparent not only in the obvious areas of clinical competency and increased research activities, but also because of the more intangible areas of attitude and departmental pride. The visibility of the faculty in collegiate and university committees is also likely to illustrate an increased level of status and respect.

"the surest way to improved status is the success that follows belief in the program"

Although most administrators I know sincerely strive to maintain objectivity and impartiality, they too are likely to be affected. When an administrator senses a 100% effort, witnesses a surge in productivity in any activity (whether it is in teaching, research, or service), and is exposed to a positive attitude, he or she can't help but respond in kind. Remember that these suppositions are based on the hypothesis that a quality graduate program is established in the face of a perceived loss of status and respect.

I believe the surest way to improved status is to experience success. And a catalyst to success is a belief in success—a perception that progress is being made. Any unit, whether it be an operative department or any other depart-

"graduate programs are not subject to review by any outside agency"

ment (or college, for that matter), can do wonders by being positive about itself. If its attitude is sincere, it is soon reflected to others, especially students, who potentially are graduate students and faculty.

There are other characteristics that are uniquely yours and affect the ultimate impact of a graduate program, such as:

(a) The scope of your discipline can be nearly as broad or as narrow as you like.

(b) Your graduate programs are not now subject to review by any outside agency such as the Commission on Dental Accreditation.

(c) Patients presenting to the clinics of a dental school generally have more needs for operative dentistry than can be managed in the time allotted to the predoctoral curriculum.

When assessing the total impact of all these factors on the department or the institution, it is important to note the high degree to which they are interrelated *and* interdependent. For instance, recruitment of faculty is affected by funds, image, research potential; caliber of students is affected by the quality of faculty, image of the graduate program, and funding; status or image is highly independent on all of them.

CONCLUDING OBSERVATIONS

As I conclude I would like to address a concern I found expressed in your literature that had a definite impact on me, primarily because I've not had to face it firsthand before. It concerns me, too, or I wouldn't bring it up. The issue was epitomized by, but certainly not limited to, a title of an editorial, "Are Specialists Spoiling Dental Education?" (Hamilton, 1978). That editorial, as well as other references, articulated the issue in a very thought-provoking manner. I hope I won't sound defensive because I don't really feel that way. At least I haven't since I finally concluded he wasn't really aiming it at deans. Besides, deans aren't really specialists once they become deans; some say they aren't anything at all.

The seed of the issue, as I understand it, is concern that the curriculum of most schools is becoming too specialty-oriented when the usual stated objective is to educate a generalist. The argument that dental education is increasingly specialized is probably valid. I believe this is a logical outcome of a vast increase in knowledge and more faculty committed to careers in education where they all become specialists or experts of some sort. It should be noted that operative dentistry is considered a special discipline in our school.

To carry the issue one step further, I seriously question the assertions that this is ruining dental education, that it is de-emphasizing treatment of the patient as a whole, and that it is at the expense of highly qualified dental educators in general dentistry. Never have more schools been stressing the importance of comprehensive care where all the needs of the patient are met. Never have we seen a greater number of educators who are committed to the

"I see no decrease ahead in the demand for dentists who are skilled in operative dentistry"

education of the family dentist or generalist. And it has only been recently that these generalist educators have acquired authentic academic credentials which protect them from the status of second-class citizens in the university environment.

As to a possible diminished recognition or support of operative dentistry, I would like to share with you where I stand by telling you briefly what I believe and where we are in our institution to illustrate it:

1. It is clear that the need for high quality restorative dentistry by the citizens of our society has not diminished appreciably despite fluoridation, emphasis on prevention, and education of patients.

2. In the face of a gradual increase in demand for dental care, increased percentage of elderly in our population, and an increased concern for the needs of the elderly, I frankly

"we have had a viable, quality graduate program for 24 years"

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don't see a *decrease* in the demand or need for dentists who are skilled in operative dentistry—at least over the next half century or longer. (Oral surgeons, maybe; operative dentists—no.)

3. Operative dentistry has not been de-emphasized in our school—nor will it be! In fact, our faculty has taken steps over the past several years to strengthen it.

4. The faculty of our operative department is among the most highly respected in the college and in the university.

5. These faculty are among the most sought-after for committee appointments, leadership roles, and in making decisions.

6. An analysis of activities of the faculty for our recent accreditation visit revealed that the operative department was one of the leaders in such activities as publications and continuing education.

7. All of the operative faculty are active, productive participants in our intramural practice.

8. We have a viable, quality graduate program in operative dentistry and have had for 24 years.

9. The chairman of our operative department is the "dean" of chairpersons in our college, not only in tenure but more importantly in respect and admiration by the students, his peers, and certainly the dean!

These are but a few of the indicators that keep us from diminishing the recognition or support of operative dentistry in our college. Wally wouldn't let us even if we were dumb enough to try! I hope no other schools are either. If they are, I hope you will be there to be heard loud and clear. I wish you the very best in meeting the challenges that face you.

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How To Start a Graduate Program in Operative Dentistry

WALLACE W JOHNSON

Unlike the other disciplines in dentistry, graduate level or advanced training programs in operative dentistry are very few. Because operative dentistry is so fundamental in the training and education of every dental student, and because operative dentistry is not a specialty of dentistry, there has never been a need within the profession of dentistry, or a stimulus applied to the schools of dentistry, to establish advanced educational programs in the discipline. Therefore, without knowing each of your individual collegiate settings, it would be presumptuous of me to imply that what I have to say about starting a graduate program in operative dentistry would apply to your particular school. I hope these suggestions will be helpful, however.

First Prerequisite: Departmental Support

Before a graduate program in operative dentistry can ever have a beginning, there must first be a sincere interest from at least four sectors of the school of dentistry. Prerequisite to all other areas of interest for a program is the interest exhibited by the faculty of the operative department. However, at the same time, and with equal vigor and enthusiasm, a sincere interest in a graduate program should be shared by the department head or chairman. These two sectors are the most important, because this group of persons will have to shoulder all of the work and effort in planning, in gaining acceptance and approval, and ultimately in implementing and running the program.

A third area of interest in this endeavor must come from the dean of the school. Obviously, a graduate program in operative dentistry will not come to fruition if the dean is not supportive. On the other hand, the graduate program will also never see the light of day if the dean is the only person interested. The dean should listen to the departmental proposals with an open and receptive mind, and if these proposals are reasonable and workable, he should find the means to support them.

And last, but by no means least, the other departments in the school who have graduate programs of their own should be a source of support for the beginning of a new graduate program. Although there may not be a heavy educational interchange between the various graduate programs within the dental school, there are many other forms of academic ex-

University of Iowa, College of Dentistry, Iowa City, IA 52242, USA

WALLACE JOHNSON, DDS, MS, professor and chairman of the Department of Operative Dentistry

"your first effort is to identify the extent of interest and support within your school"

change, cooperative ventures, personal give and take, and a high degree of common respect that are so valuable to the departmental faculty, the graduate students, those persons involved in research, those involved in clinical treatment, those involved in required, basic science, and elective courses, and those involved in writing a thesis and evaluating candidates. The larger the number of functioning graduate programs, the better and broader this personal and departmental exchange is.

So, your first effort is to identify and clearly understand the extent of interest and support you have for beginning this proposed new graduate program in your school.

If, at this point, you have the green light to proceed, the departmental faculty must now go to work.

Exploring the Issues

The faculty should identify and fully discuss the positive and negative issues dealing with developing a graduate program in the department. Some of the issues that should receive attention are:

- What is the composition of the faculty in the department? Are there sufficient full-time faculty to run an effective program? Can the adjunct faculty be involved with the teaching of graduate students? What are the chances of adding full-time faculty who can help in the entire teaching program of the department, but in so doing ensure the success and quality of the graduate program?
- Are all of the departmental faculty willing to teach and take a responsibility in the graduate program? This means a willingness to be a student adviser, to teach seminars and advanced clinic, to advise in research programs and thesis writing, and be on thesis committees and program review committees.

Some may not want to. Some may be apprehensive of what a commitment to the graduate program will involve, and graciously decline. On the other hand most of the faculty may be quite receptive to all the possibilities a graduate program holds for the department, and be very willing to become involved.

Of course, the commitment of time will be a well-used argument against adding a graduate program to an already overloaded departmental faculty. Many persons will insist that they now have 100% student contact, and as a result have no time for research and writing. So how can they be expected to take on an additional load teaching graduate students? Such feelings and arguments stem from a sincere concern about the use of faculty time. They may never be answered to the satisfaction of some of the faculty prior to implementation of the program. From our experiences, I can say that graduate students do require faculty time, occasionally extra time. But it does not seem

"added faculty time is compensated by the positive relation between adviser and student"

to amount to an overburdening of the faculty. Usually, the relationship between the faculty adviser and his student becomes quite positive. The student's progress and growth during the program becomes an important personal concern to the faculty adviser, and therefore the time spent in the student's behalf is usually freely given, and often enjoyed.

You will also hear as an argument that the attention paid to the graduate students will detract from the effort now given to teaching the undergraduate dental student. After all, educating dental students is our primary mission. This concern will also have to be clearly answered, because many people in operative dentistry sincerely believe it to be so.

To a degree beyond that of any other discipline in dentistry, operative dentistry is bridled and saddled with this singular, moral commitment to the program for undergraduate dental students. While we accept and even expect to find advanced training programs in perio-

"visits to one or more schools are helpful in establishing your graduate program"

dontics or fixed prosthetics, many of us have not yet granted such a privilege to operative dentistry.

In our experience, our graduate program continually contributes in every dimension to the undergraduate program. Far from causing a deemphasis in the undergraduate teaching effort, the scientific, educational, and clinical growth experienced by our faculty from their simultaneous involvement in the graduate program is readily passed on to the undergradute student.

What about the members of your faculty that do not have advanced degrees? Can they teach in the graduate program? The answer to this question will be different at the various schools. Offhand, I would say yes, or I would strongly encourage the full participation, wherever possible, by all of the departmental faculty in the program. In addition, the department, along with the school, should work out a system whereby all of the faculty not having an advanced degree can work toward one, either as the first students in the new graduate program, or in some parallel program.

And finally, before your department makes its decision about the graduate program, a committee of two or more individuals should visit one or more schools that have ongoing programs in operative dentistry. Such visits could be very helpful in establishing a program.

Setting Up Your System

Assuming, for the purpose of this paper, that the attitudes, conditions, and decisions in the department and the school are favorable for starting a program, what happens next? There are many issues of a different nature that have to be resolved.

How Many Students?

How many graduate students can be accommodated each year? One? Two? Three? More? It is wise to keep the number reasonable. Remember, during the second year you can and may have twice the number on board that you had the first year.

Part-time Students?

Can the program accommodate part-time students? The program of a part-time student will never be as neat and orderly and sequential as that of a full-time student. However, it can be managed very effectively.

How Long?

What length do you want your graduate program to be? One calendar year? One or two academic years? Two calendar years? or a certain number of credit hours? Again, make the planned length of your program reasonable. I would suggest a time span of two academic years plus the summer period in between, or about 20 or 21 months. We have set a minimum of 48 semester credit hours to graduate, which

"before you begin, resolve the different issues that will be involved"

can be comfortably completed in the 21 months. Eight of these 48 hours may be transferred in from another accredited graduate program.

Space?

Graduate students will need space. When planning for this, you should include study space or a home base, a small office, or similar room where the student can have a desk and store his belongings. In addition, you will need to provide clinical space, seminar or classroom space, and some form of research space. Although much of this can and will be shared space, it should be accounted for in your initial planning.

Funding?

What will be the graduate tuition? Who gets these funds? Can the department get a graduate program operating budget? Who gets the graduate clinical income? Will there be funds to support research for graduate students, or

"the answers to your questions will help in designing the kind of program you want"

will this be the students' expense? What is the possibility of stipends for graduate students (usually in return for part-time teaching or other work in the department)?

Other Costs?

What are the costs to the graduate student besides tuition? Will he have instrument purchases, or instrument usage fees to pay? Will he have to pay for the preparation of his thesis? Clinic coats and laundry? Duplication of journal articles and the like? Other office supplies? Will the full-time graduate student be allowed to work or practice part-time away from the school to supplement his income?

Licensure?

Will licensure be necessary for the graduate students to do clinical work? Can they be granted temporary licensure? Will they need malpractice insurance? Will insurance coverage be a departmental expense or a student expense?

When we have some answers to these questions and issues, we then need to turn our attention to the educational program, which, after all, is the reason students enroll in your program.

Other Considerations

As you begin to put your program together, it may be helpful to dwell for a moment on such questions as:

Emphasis. What kind of a graduate dentist is it that applies to a nonspecialty program such as operative dentistry? What advantage could your program possibly offer a young professional who will have to spend two years of his or her productive life in this kind of endeavor? Some answers to these questions could be helpful to you while you are designing your program. Depending on your answers, you may want to make your program attractive through its emphasis on science and research, or its clinical and professional emphasis, or its broad training in many of the dental disciplines.

Kinds of Courses. You will next need to give thought to what kinds of courses your program will include and require. How many credit hours will be given each course offered within the department? How many and which courses will specifically be required for graduation? How many credit hours will be left open for elective courses both inside and outside the school of dentistry? How many hours and what kind of requirements will be given the clinical phase of the program? How much time and what amount of credit and emphasis will be given the research and thesis phase of the program?

Planning for Two Tracks. As you plan your program, I would suggest that you plan two tracks, or in a sense, two separate programs.

"an attractive program has a certain emphasis and offers choices"

The first program will be your degree program. It will have the research and thesis component, and may or may not be a slightly longer program. The second track or program will be a clinical or professional improvement program, and will earn the student in this program a certificate in operative dentistry. There will be students who will be attracted to your school because of these choices in your program.

Maintaining a Workable Balance. You should be warned to steer clear of the tendency to make your program too heavy, too loaded with courses, overregulated with requirements, and scheduled so tightly there's no time for lunch. We should keep in mind that a graduate program is not intended to be a second baptism in the dental curriculum, nor should we attempt to make our graduates super dentists who excel at everything. If our program is too heavy, it will suffocate our students, and our dropout rate will be high.

"the structure of the student's time should encourage his best working efforts"

On the other hand, our graduate programs should have required courses and clinics, and they should have course and clinical requirements. There should be deadlines and goals, and there should be an environment that commands quality and performance from each student. However, our programs should have ample time open for study, reading, writing, laboratory work, library browsing and research, materials research, study and trial; and best of all, time for the individual pursuit of subjects of special interest. In a sense, the graduate student should be left alone, to mature and be responsible to himself for his growth and progress, yet he should never feel that he is alone and adrift. He should always feel that the members of the departmental faculty are his friends as well as his mentors. He should feel that someone does care about his growth and progress, and that his performance in the program is being monitored. This monitoring should be in the form of encouragement to stay with it, to work harder, to dig deeper; or in the form of friendly criticism and correction when necessary; or in the form of praise for things well done; or in the form of explanations of concepts and techniques through discussions and demonstrations; or in the form of help so that he can complete his research; or help in making his thesis a respectable scientific article.

The formal structure of the course, though very important, does not make a graduate program. The heart of the graduate program is the faculty, who by means of the formal structure are able to pass on their wisdom and experience as they relate to the scientific, academic, and professional aspects of dentistry.

Keeping Things Clear. I would suggest that as you prepare your schedule of courses for your program, you should keep your departmental course titles as simple and noncommittal as possible. Let the course description for that title describe the content of the course. For example, you could designate the discipline seminar courses that will be given each academic semester or term as Operative Dentistry Seminar I, II, III, IV, and V. Your clinic courses could be titled Advanced Clinic I, or Graduate Clinic I, II, III, IV, and V. The courses would be given appropriate and progressive course numbers that comply with the collegiate or university system. These formal titles and course numbers should not confine that course entry to a single subject. They simply represent a superstructure onto which the descriptive content of the course is attached. There will then be descriptions for each of the course or seminar entries, and for each of the advanced clinics that are listed. The courses actually given under these nonspecific titles can be broad in scope or narrow, and can meet as often or as seldom as the instructors wish. The courses and course descriptions can change or be changed at any time, and be done within the department, without changing the entire program format, or without obtaining higher levels of approval.

"keeping course titles simple leaves room for flexibility"

Keeping Things Flexible. Credit-hour designations for the courses specifically required to obtain the degree should probably be fixed. All other courses that would make up the total number of hours for graduation should be for arranged credit. This allows for the greatest flexibility when arranging individual schedules for students.

I would also suggest that you have a "catch-all" course in each of your semester or term listings. We have such a course called "Clinical Demonstrating," with the credit hours to be arranged. We use this course designation for special student activities or projects like practice teaching, extra research projects, literary reviews and independent study.

I would also suggest that you spread the hours of credit given to the research project over the four or five terms or semesters that your program runs. Then, in the course description, goals and even deadlines of accomplish-

"a small, well-controlled project will teach more than a large, time-consuming one"

ment within the research project can be designated for each term. By these means the student's research effort flows smoothly through to its completion, with each phase being done in its proper time.

Keeping Research Effective. It is a good idea to keep the students' research projects within reasonable limits of time and difficulty. Remember that these are master's level research projects. Their intent is to teach the student research methodology by his actually doing a project. These projects do not have to be earthshaking, nor should they be something with which a PhD candidate would have difficulty. I find that both our faculty and our students have a tendency to be overambitious when it comes to research projects, and often plan more of a project than can be accomplished in the designated time. A small, simple, but well-designed and controlled project will teach more about research methodology than a large project that is very time-consuming and has a number of uncontrolled variables. Student research projects are also more effective when they are small segments of the faculty adviser's overall research program. In such cases, the faculty adviser is more interested in the student's progress, in seeing that things are planned and done correctly, and that, after the thesis is done, an article is prepared for publication.

Elements of Administration

Finally, when all of your plans are complete and down on paper, you should become acquainted with the administrative channels and paperwork necessary to achieve school approval, university approval, or graduate college approval of your program. This can be time-consuming in and of itself.

In addition, you will need to become acquainted with or work out the methods, materials, booklets, and other means by which you can promote or advertise your program; how students will be able to apply to your program; how the applications will be reviewed and selections made; how registration works for graduate students; and how grades and credits are reported. You might even look into what your certificates of award will look like, and what kind of lead time is necessary to have them ready for graduation.

In Conclusion

No matter how thorough I have tried to be in this paper there are yet questions, issues, and suggestions that I have not covered. I do hope that what I have said has not frightened you, nor discouraged you. Instead, my sincere wish is that you will be able to establish a graduate program, and through it experience new and challenging dimensions in operative dentistry. Your investment of time, money, and effort into your program will be returned many fold to your faculty, your department, and to all of your programs of teaching and service in ways never before thought possible. You will be able to observe the transitions.

What Should Be the Content of a Graduate Program in Operative Dentistry?

GERALD T CHARBENEAU

The theme of this meeting—"The Need for Graduate Education in Operative Dentistry"—appears to imply a neutral position, and this may well have been intended. When a speaker is invited to address a specific subject without knowledge of the persuasion or opinion to be presented by any of the speakers who precede him, he can put himself out at that most distal extension of the proverbial limb. Using this prepared paper, then, I chance sawing through that limb somewhat mesial to my position.

With this group of educators and practitioners, the Section on Operative Dentistry, each member of which is dedicated to excellence, one must take a position—that indeed there is a need for graduate education in operative dentistry. If the assumption were negative, I would have nothing to say, for no graduate curricula would exist. I frankly admit to my bias for this continued formal educational endeavor, I am enthusiastic about it, and am most pleased to share my thoughts with you regarding the content of a graduate curriculum.

One's view of curricular content for a graduate program in operative dentistry depends upon his orientation to this area of dental education and practice—what is perceived as the goal or objective of such a program. If one views operative dentistry as working within the boundaries of coronal tooth tissue in the repair of destruction caused by dental caries, he could perhaps justify a rather simplified but somewhat sophisticated program that would parallel that of a typical undergraduate curriculum in operative dentistry. It would be a program of some greater depth, and one could learn not just how to do better restorations, but the basis supporting the operative principles being practiced. Such a curriculum would stress literature review, dental materials, and have lots of clinic time. Program content of this nature is basic, it is necessary. And, there could be infinite extensions and ramifications. But, it is not sufficient! It is restrictive!

Reflect a moment on your responsibilities to

University of Michigan, School of Dentistry, Ann Arbor, MI 48109, USA

GERALD T CHARBENEAU, DDS, MS, professor and chairman of the Department of Operative Dentistry

"first, consider what you think your students should be learning from you"

your students of operative dentistry, in relationship to their responsibilities to patients. Don't clutter up this reflective process by imposing upon yourself limitations—supposed limitations of academic rank, department organization, present curricula, or even administrative blocks. Just close your eyes for a moment—really concentrate your thoughts on that topnotch student of yours—what should he be learning from *you* as a teacher of operative dentistry in order for him to provide optimal health care for his patients? And remember, 40% of his time with patients will be spent in performance of operative treatment (Council on Dental Education, 1977). What characteristics come to your mind? Do not some of these?

- Technical skill
- Diagnostic and treatment planning skills, integrated with all treatment areas, and even for complex rehabilitation
- Definitive correlation of at least the closely allied clinical disciplines, such as periodontics and occlusion, with restorative procedure
- Correlation of the oral sciences—microbiology, histology, pathology, pharmacology, and others with clinical practice
- Recognition of the need to be a continual student so as to enhance treatment capabilities

We could continue on with many more highly desirable characteristics that you should like to impart to students, but let's stop with these few examples. Enhanced knowledge and skills in these areas would help to make better practitioners!

Now, just because some of the characteristics may fall outside the realm of someone's stilted definition of what constitutes operative dentistry, we should not consider them in an untouchable, private domain. All of these characteristics—and many more—are native to the general practitioner, and really native to operative dentistry. Remember that historically all of dental practice, with the exception of prosthetics, was included in operative dentistry. If we abrogate what we truly believe to be part of our responsibility for instruction, who will assume it? Will the periodontist, the endodontist, the oral surgeon?—surely none of the specialties!

A graduate curriculum in operative dentistry should include those subjects that will better permit operative faculties to help its graduates learn to perform *excellently.* Our sphere of interest is only *one* of the areas of practice, that, together with all the others, contributes to the total oral health of an individual. All areas of the science and art of dentistry must function in concert—none can exist alone—because the unit of treatment is the patient, not a special discipline arbitrarily delineated for instructional purpose. And, most important, the operative teacher is in the position to

"the graduate curriculum should enable the student to attain excellence"

orchestrate treatment for the patient, to arrange and combine so as to achieve maximum effect.

Operative dentistry is fundamental to all clinical dentistry. Perfection of the knowledge and skills that constitute operative dentistry, together with the assimilation of the oral sciences and the intimately related clinical disciplines, and a continuing quest for truth (through clinical research)—these should be the premise of graduate programs in operative dentistry.

Specifically, we can state a curriculum that emphasizes:

1. Restorative dentistry: operative in breadth and depth
2. Periodontics and periodontology: related to restorative procedures
3. Occlusion: its broad principles; its relation-

"the beneficiary, in the final analysis, will be the patient"

ship to conservative dentistry, conservation of tooth tissue; optimal function and occlusal stability—*not* philosophies that support preconceptions

4. Oral sciences: their special relationship to operative practice
5. Research investigation: a quest for truth
6. Dental education

Some fears have been expressed regarding specialization in operative dentistry. I wish to state, as I have many times before, that I am personally committed to the education of dental students by the specialist. Persons with a special interest in operative dentistry, with a devotion to the field, with special knowledge and skills and, perhaps, with special training, create the *potential* for greater learning. All other things being equal, the trained periodontist should best be able to teach periodontics; the trained oral surgeon should best be able to teach oral surgery; the endodontist, endodontics; *and* the operative dentist, operative dentistry. It seems to me that one must learn to walk before he runs—learn the fundamentals of each clinical discipline before beginning to practice as a generalist.

Graduate education in operative dentistry that encompasses the areas I've described, even if some day requisite for specialization, is not as one of our colleagues suggested "... another step in the fragmentation process of our profession" (Abrams, 1979). Graduate education in operative dentistry, broadly based, will help re-establish the cohesiveness of the elements of dental practice that contribute to excellence in restorative treatment of patients. The result should unite, not separate. Such an experience is superimposed upon the desirable characteristics of a good clinical teacher. Although an additional degree does not necessarily assure excellence in teaching, it is evidence of education and training that should contribute positively to student learning. In the final analysis, the beneficiary will be those who seek our professional service—the patient (Charbeneau, 1979).

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OPERATIVE DENTISTRY

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PART 1: PROFILE OF A CLINICAL TEACHER

PART 2: THE NEED FOR GRADUATE EDUCATION IN OPERATIVE DENTISTRY

University of Washington
School of Dentistry SM-57
Seattle, WA 98195 USA