the journal of the

AMERICAN COLLEGE OF DENTISTS

OCTOBER, 1979 VOLUME 46 NUMBER 4

Oral Health and the Elderly

Analysis of Dental Techniques

Educational Values Clarification

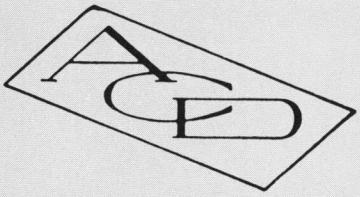
Health Maintenance Organizations

Dilemmas of the Multiple Prescription

MEMBER PUBLICATION
AMERICAN ASSOCIATION OF DENTAL EDITORS

THE JOURNAL OF THE AMERICAN COLLEGE OF DENTISTS
is published quarterly — In January, April, July, and October — at
Crescent & Mulberry Streets, Harrisburg, Pennsylvania 17104
Second class postage paid at Washington, D.C. and additional points.

Send Change of Address and Form 3579 to the American College of Dentists,
7316 Wisconsin Avenue, Bethesda, Maryland 20014.



NEWS AND COMMENT

PACKAGE LIBRARIES STILL AVAILABLE

After considerable difficulty in assembling the materials, Executive Director Robert J. Nelsen has about 200 sets of package libraries on dentistry available for distribution to high school or other appropriate libraries. In spite of increased costs, the price is still $20.00. Fellows may still order theirs through the office of the College in Bethesda, Maryland.

SECTION NEWS

Texas Section

The Second Annual Continuing Education Program sponsored by the Texas Section was held on September 29th at the University of Texas Health Sciences Center at Houston, Dental Branch. The program was open to all and a large attendance heard the following presentations:

Clinical Oral Surgery - Carl Schow
Roentgenographic Diagnosis - James K. Foster
Dental Management of Cancer Patients - Joe Drane
Endodontic Surgery - Frank B. Trice

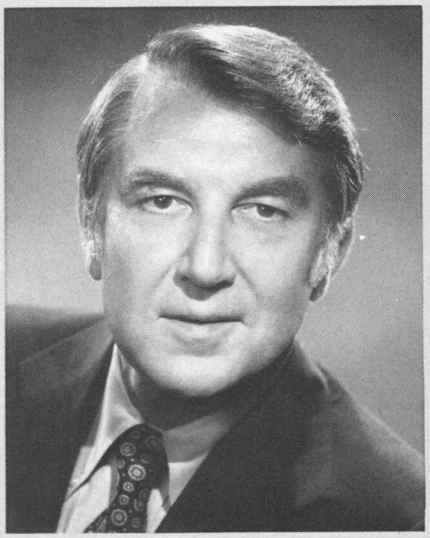
The moderator for the program was John Victor Olson, who also spoke briefly on dental education in Houston. Section president Willion H. Ritchey brought greetings and offered some closing remarks.

Luncheon was held at the University Faculty Club and John Wilbanks, immediate past chairman of the Section was the speaker.

The Texas Section is host to the College at the annual meeting and convocation in Dallas. We look forward to a great meeting.

Section officers for 1979-80 are William H. Ritchey, president; James P. Addison, president-elect; Morris Barrington, vice-president and Robert E. Lamb, secretary-treasurer.

NEWS OF FELLOWS



John M. Coady who was acting executive director of the American Dental Association has been named executive director.

For six years, Dr. Coady served the Association as assistant executive director for education and hospitals. He joined the ADA staff in 1963 as assistant secretary of the Council on Dental Education and in 1970 became Council secretary.

A native of Minooka, Ill., Dr. Coady received his dental degree in 1953 from Loyola University of Chicago School of Dentistry and a master of science degree in oral pathology from Loyola's graduate school in 1960.

He maintained a private practice between 1954 and 1957 in Morris, Ill., and taught at Loyola during that time and until 1963 when he left fulltime teaching for dental administration.

Maynard K. Hine, former Dean of Indiana University School of Dentistry, former Chancellor of Indiana University-Purdue University at Indianapolis, and Past President of the American Dental Association, the American Association of Dental Schools, the International Association for Dental Research and the Federation Dentaire International recently received the honorary degree of Doctor of Science from Indiana University.

D. Walter Cohen, Dean of the University of Pennsylvania School of Dental Medicine, spoke recently at Hebrew University in Jerusalem, at ceremonies during which he received an honorary Doctor of Philosophy degree.

Louis Terkla, dean of the School of Dentistry, was awarded an honorary Doctor of Science degree from Georgetown University School of Dentistry, Washington, D.C., at commencement exercises in May. He also delivered the commencement address. Dr. Terkla was

(continued on page 254)

the JOURNAL of the AMERICAN COLLEGE of DENTISTS

(ISSN 0002-7979)

A QUARTERLY PRESENTING IDEAS IN DENTISTRY

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Bethesda, Maryland 20014

OCTOBER 1979

Volume 46—Number 4

THE JOURNAL OF THE AMERICAN COLLEGE OF DENTISTS is published quarterly—in January, April, July, and October—by the American College of Dentists, Inc., McFarland Co., Harrisburg, Pennsylvania • Subscription $12.50 a year; $13.50 overseas; single copies $4.00 • Second class postage paid at Harrisburg, Pa. and additional points •

Correspondence relating to the JOURNAL should be addressed to the Editor, One South Forge Lane, Cherry Hill, New Jersey 08002. Changes of address and subscription requests should be addressed to the Business Manager, JOURNAL OF THE AMERICAN COLLEGE OF DENTISTS, 7316 Wisconsin Avenue, Bethesda, Maryland 20014. Reprint requests should be directed to the author.

The JOURNAL is a publication member of the American Association of Dental Editors.

For bibliographic references the JOURNAL title is abbreviated J Am Col Dent and should be followed by the volume number, page, month, and year. The reference for this issue is J Am Col Den 46:197–256, Oct. 1979.

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REED IRVINE
Convocation Speaker

Reed Irvine to Address Convocation

The principal speaker at this years annual Convocation of the College in Dallas is Reed Irvine founder of Accuracy in Media, the one media watchdog that has a real bite, and singlehandedly provided the research, analysis and writing skill that has made it a force to be reckoned with in the field of journalism.

Columnist Les Kinsolving has written that Irvine knows "how to get under the thin skin of numerous hierarchs of that big business called Big Media." He says, "With a devastating blend of accurate research and aggressive resiliency, Irvine takes deadly aim and evokes volcanic range and generally unsubstantiated denunciation from the highest echelons of Mediacracy."

Irvine has written and edited the AIM Report, Accuracy in Media's provocative twice-monthly newsletter since 1972. He also writes a syndicated weekly newspaper column about media errors and distortions. He pioneered in confronting the top officials of the companies that own the major media at their annual shareholder meetings, demanding that they subscribe to professional codes of ethics, employ ombudsman to handle complaints from the public and account for serious errors and omissions in their treatment of news and public affairs programs.

Irvine, a Marine Corps veteran of World War II, holds degrees from the University of Utah, where he was elected to Phi Beta Kappa, and Oxford, where he was a Fulbright scholar. He is an economist by profession and served as an adviser in the Division of International Finance of the Board of Governors of the Federal Reserve System until his retirement in 1977. Since his retirement from that position at age 55, he has devoted his full time to Accuracy in Media. He is an articulate and provacative lecturer and panelist. The College is pleased to have Mr. Irvine as its convocation speaker, and looks forward to hearing his message.

Editorial

Dental Health Education in the Work Place

At mid-morning, on their coffee break, the employees made their way to the plant cafeteria where they noticed, on a table in one corner, an automatic slide projector that was showing a film strip. While drinking their coffee they watched a short presentation on dental health. In another plant, the workers looked at a movie on modern dentistry, while in a third, a dentist talked, showed slides and answered questions on the benefits of proper dental care.

"I never knew much about dentistry," said one employee, "I always thought that sooner or later I would have to lose all my teeth and wear dentures. I know now that it is possible to keep them all my life. I guess I'll call up and make an appointment to have my teeth checked."

Does this sound far-fetched or unusual? It may well become commonplace if a plan being developed by the American Dental Association is approved. For many years, education in dental health has been customarily directed toward groups of school children, to parents (mostly mothers) at PTA meetings, or to patients in the dental office on a one-to-one basis. Recognizing that there was a large untouched segment of the population which had never received the benefit of such information, the ADA Bureau of Dental Health Education, the Bureau of Economic Research and Statistics and the ADA Health Foundation Research Institute are requesting funding from the National Institute of Dental Research to set up educational programs in the work place.

It would appear logical that industries and labor unions which fund health and welfare plans for their employees would welcome such efforts. The cost benefits and the saving in time lost through dental disease should make the work-place program attractive.

We commend the initiative shown by the ADA and hope that its proposal to penetrate this last frontier of dental health education will be approved so that it can get underway in the near future.

R.I.K.

The Seventh Age of Man:

Oral Health and the Elderly

HELEN C. GIFT, Ph.D.

It is the final of the seven ages of man, according to Jacques in As You Like It, where we are "sans teeth, sans taste, sans eyes, sans everything."

Even four centuries ago, apparently, the aged were seen as an undifferentiated group, colored a dull gray. In fact, of course, they are no more like one another than are children. They are not even the same age.

They have differing educational, emotional and physical characteristics. The experiences that have enriched or scarred their years vary as widely as do their origins, occupations and economic conditions.

If it is necessary sometimes to group them for the purposes of study, it is well to do so with the understanding that we are looking at a few common threads amidst a rich diversity of individual traits.

In studying their needs and desires, it is always well to ask them what they think, which is what the American Dental Association did, in a survey conducted for it in January, 1978 by the Opinion Research Corporation. The methodology consisted of a personal interview administered to a probability sample of 1,949 adults, 18 years of age and older, living in private households in the continental United States.

The primary purpose of this paper is to present findings from that survey based on the weighted responses of those respondents who were 60 years of age or older.

This article is adapted from a paper presented at a symposium on Social and Behavioral Aspects of Geriodontics at the 57th annual meeting of the International Association for Dental Research.
Dr. Gift is Director of the Bureau of Economic Research and Statistics, American Dental Association, 211 East Chicago Ave., Chicago, Illinois 60611.

A secondary purpose is to suggest one possible approach toward understanding better the diverse oral health needs of the nation's 23 million elderly and, thus, designing ways to best meet those differing needs.

Over the years, a number of efforts have been made to improve the dental health status of all Americans through such activities as water fluoridation, improved materials and practice procedures and more extensive health education. While the focus may have been in large part, on improving the oral health of children and young adults, there was an assumption that such programs would pay benefits, as well, throughout life and into old age.

Unfortunately, there is little in the way of trend data that allows us to compare changes in the oral health status of the elderly. The only real comparison over time is the proportion of denture wearers, which may be a proxy measure of some value in ascertaining levels of oral health. Comparing 1960 and 1975 studies performed by National Family Opinion for the American Dental Association, one traces a reduction in the percentage of the adult population (more than 29 years of age) from 35.2% to 24.7% who wear at least one complete denture; among those 60 years of age or older, a reduction is seen from 62.5% to 40.8% wearing at least one complete denture.

As more elderly people retain their natural teeth, they will have a need for more comprehensive dental services. Some of these needs already seem to be apparent in the response from those 60 years of age or older. Among the findings are these:

—One third of the elderly population (age 60 and older) are very satisfied with the state of their health; another 42% are fairly satisfied, and 8% are very dissatisfied with their general health.
—Nearly 50% are very satisfied with the condition of their teeth (or dentures) and gums; another 30% are fairly satisfied, and 9% are very dissatisfied.
—Fewer men age 60 and over are very satisfied with their oral health status and more are very dissatisfied compared with women of the same age.
—44% report having full dentures, while 16% report having all of their natural teeth. Another 38% report having partial dentures or some missing teeth, but not having dentures.
—The presence of full dentures is highly associated with low income with 51.6% of the poor wearing full dentures and 37.7% of the near poor, while partials are correlated with high income, over 40% of the two higher income categories report wearing partials.

—People with all or most of their teeth are far more likely to report going to a dentist every six months or 1 year. People with full dentures or some missing teeth with no dentures are more likely to go to a dentist only as needed or to go never.
—Elderly persons in the $10,000–$15,000 income category report the most frequent utilization pattern, 43.9% every six months and 26.4% once a year. Within the low income groups of under $7,000 the majority report only going as needed and over 12% report never going.
—When asked the hypothetical question:"Suppose you didn't go to the dentist during the next year, how much dental work would you guess you would accumulate during that time?" nearly 40% of those over 60 indicated none, while 22% indicated they would only need a routine check-up and cleaning, 13% felt it was possible that they would need fillings, 12% expected complicated treatment, and another 16% indicated no opinion.
—Almost 50% of the elderly indicated that it had been three years or longer since going to the dentist while one percent indicated that they had never been to a dentist; 24% have been within the last six months, and 11% went six months to a year before. The remaining respondents over 60 exhibited a pattern of utilization between these extremes. Last dental visit is related to several key variables. Persons with all or most of their teeth are far more likely to have had a visit within a year than those with dentures;
—Persons with incomes less than $10,000 are less likely to have visited a dentist within six months and much more likely not to have been to a dentist within three years;
—Over three quarters (77%) of those with a dental visit within the past year received their dental care from a family dentist practicing alone, 16% received care from a family dentist practicing in a group, and the remainder in another setting such as a clinic or dental school;
—For those going within a year, the services most frequently received were examination (40%) and cleaning (56%) followed by restorations (28%), dentures (21%) and oral surgery (14%);
—Of those who had not gone within a year, 79% indicated no need to go, while 12% cited the cost of dental care had been a problem.
—Over 90% with full dentures indicated they felt no need to go compared with 52% of those with all their teeth.
—Over 30% of the persons with some missing teeth compared with 18% of those with all natural teeth thought costs were too high;
—96% of the cost of dental care to the elderly ($502 million) was paid out-of-pocket in 1977;

—Among those who reported a visit to the dentist within the past year, an average expenditure of $121 was reported for that care, although 34% did report that they spent less than $50;
—Over 85% indicated that there has never been a time when they were seeking dental care and could afford it but could not find a dentist, and 77% indicated that the amount that they anticipated dental care would cost has never prevented them from seeking needed treatment;
—When asked what would happen if they received an unexpected $500 bill for dental services, nearly 50% indicated that they would be able to pay with some difficulty and another 19% indicated that they would not be able to pay; 31% felt that they would be able to pay comfortably, some of these with the assistance of dental insurance (10%) reported having insurance that helps with payment of dental bills in some way).

OBSERVATIONS

Much of the research performed on dental care utilization, including this survey indicates that dental care is generally viewed by the public as "elective". This common perception, combined with the income status of the elderly, suggests obvious causes for low utilization of dental care. But other economic factors, specific to the elderly, also serve as utilization deterrents. For example, dental care is largely paid directly by the consumer; coverage of the elderly by private dental insurance plans is limited; coverage of dental services under Medicaid is limited, and Medicare offers little coverage at all.

The problems of access to care though, are due to a multitude of factors in addition to income. These include: 1) emotional and physical stresses concomitant with the aging process; 2) complete physical and mental disabilities resulting from chronic diseases; 3) physical barriers to access to care due to geographical isolation; and 4) the lack of specially designed health care facilities where necessary. These known access problems must be addressed in the context of knowing that millions of elderly people are already receiving appropriate treatment.

A first goal of research might be to identify those elderly for whom we have special concern with regard to the receipt of adequate oral health. Looking at subdivisions along several dimensions—level of oral health, level of individual resources, and level of individual mobility—a conceptual framework could be developed. Figure 3 illustrates this approach to the study of the elderly population.

FIGURE ONE

General Background Statistics of the Elderly Population

—As of 1976, the elderly population in the United States was 22.9 million, or 10.7% of the total population. By the year 2000, there will be over 30 million elderly persons, nearly 12% of the total population.

—62% of the elderly population is age 65–74, 29% is aged 75–84 and the remainder are 85 years or older. Nearly 60% are female and over 90% are white. At age 65, the average life expectancy is about 15½ years. Well over one-half of the elderly live in an urban area (63.6% live in or near a city of over 25,000 persons) and over one-half (54.1%) live with a spouse.

—The median income of families headed by elderly persons was $8,057 in 1975, while the median income per person, 1975, age 65 and over was $3,655.

—The proportion of the elderly population below the poverty level has been sharply falling in the past decade and a half. In 1959, 35% of the elderly were poor, while in 1974 only 16% could be classified as such. However, the percentages of those under the poverty level remain relatively high for certain segments of the elderly population including individuals not in families, women and blacks.

—In 1975, New York and California each had over 2 million elderly persons. Other states with an elderly population of over 1 million were: Florida, Illinois, Ohio, Pennsylvania, and Texas.

—Percentage-wise, those states with the largest elderly population are in the farm belt (Iowa, Missouri, Nebraska, Kansas, South Dakota and Oklahoma) and in the sun belt (Florida and Arkansas). Florida has the highest percentage of elderly people with 16.1% in 1975. The other states mentioned plus Rhode Island have percentages of over 12%.

—As measured by the percentage of high school graduates, years of schooling completed, and literacy, the educational level of the elderly population is below that of adults in general, with a little over 1/3 being high school graduates. The median number of school years completed is nine.

FIGURE TWO

General Health Characteristics of the Elderly Population

—Based on data from the National Center for Health Statistics, two-thirds of the non-institutionalized elderly regard their health as good or excellent compared with others of their age. Between ages 65 and 75, most are able to function without difficulty and enjoy a relatively independent existence. Only nine percent of the non-institutionalized elderly regard their health as poor.

—Over 3.5 million of the elderly have some type of mobility limitation because of a chronic condition; and 30% of these have severe disabilities that keep them confined to their homes.

—With advancing age, chronic conditions such as heart disease and arthritis become far more prevalent, as do various orthopedic, visual and hearing impairments. Heart disease, cancer and cerebrovascular diseases are the leading causes of death among the elderly.

—In 1974 most of the institutionalized elderly, about 962,000 persons, were in nursing homes. Of these residents, 83% were ages 75 and over, and 43% were over 85 years of age.

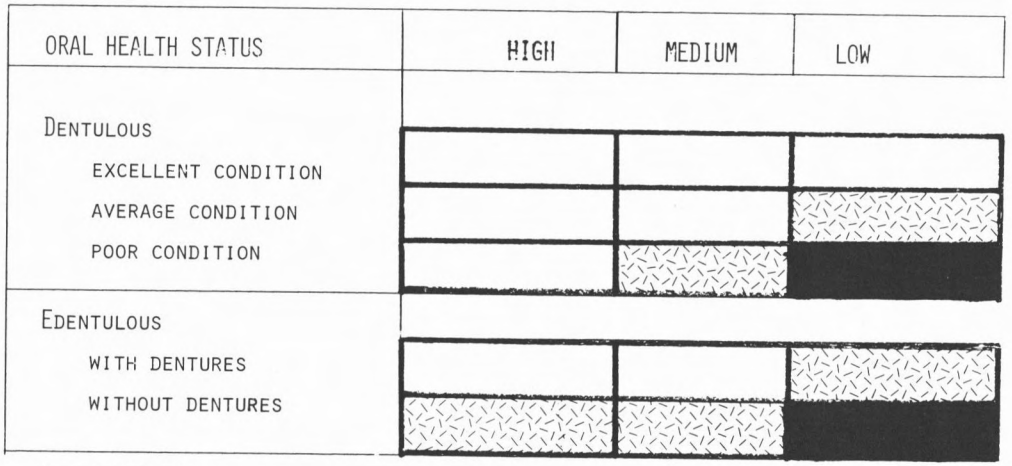
—For most of the elderly, medical care is obtained by visits to office-based physicians. The non-institutionalized elderly average 6.5 physician visits a year, with 79% visiting a physician at least once a year. Most physician visits by the elderly are for follow-up and continuing care of chronic conditions.

—Virtually all of the elderly population are enrolled for hospital benefits under Medicare. In 1975, most were enrolled for supplementary medical insurance under Medicare, which bore about 54% of the cost. Nearly an equal amount of physician services was paid from private funds of the elderly.

DIMENSIONS OF NEEDS FOR ORAL HEALTH CARE OF THE ELDERLY POPULATION,*

A DIAGRAM OF LEVELS OF PROBLEMS

CAPABILITY FOR INDEPENDENT USE OF THE ORAL HEALTH CARE SYSTEM**



* 22,400,000 ELDERLY, NON-INSTITUTIONALIZED

** INCLUDES SOCIAL, ECONOMIC AND PHYSICAL ABILITY FOR THE INDIVIDUAL TO MAKE USE OF THE SYSTEM ON HIS OWN

SCALE: LEVEL OF PROBLEM

Like any other artificial grouping, there will be internal variations, except with those characteristics that are highly associated with the variable being used to classify them; in this case, age itself is the variable. Considering just major dimensions that are critical to oral health care, finances and mobility at least four different categories become apparent:

1. Those who are economically independent, maintain a household and can travel to a source of care;
2. Those who are economically independent, but are either confined to their home or institutionalized;
3. The indigent or medically indigent who can travel to a source of care, and
4. The indigent or medically indigent who are either confined to their home or institutionalized.

Utilizing these, we can create levels of patient access to dental care which could be measured by income, availability of financing and availability of services.

The level of oral health (need for treatment) is also an important criterion in determining the elderly's utilization of dental services. The following categories would represent the components of this dimension on the vertical axis of Figure 3, as described below.

1. Those in excellent oral health whose treatment requirements would be general check-ups and prophylaxis with particular attention being given to changes as the result of the aging process. From this research, one can estimate this group to include 16.5% of the elderly;
2. Those with average oral health whose treatment requirements would be the same as with additional needs in terms of restorative or periodontal treatments to return the patient to optimal function. They would be no different perhaps from patients of any age requiring complex restorations or periodontal work except that they might fatigue more quickly. An additional potential complication, though, that is related to age might be the acceptance of the dentist's intent to restore dentition or supportive tissue. The typical argument that will persuade a 20 year old of the value of keeping his teeth the rest of his life may meet with more resistance from the elderly person. The return from an investment of money and time clearly differs in the two instances. From this research, one can estimate this group to include 27.4% of the elderly.
3. Those people with poor oral health whose treatment requirements would be the same as 1 and 2 with possible additional needs in terms of prosthodontic treatment. Patients with poor oral health

have in one sense the wider range of alternatives in terms of restoring or replacement, but could pose specific problems for the dentist in terms of time, finances and motivation for improved oral health status. From this research, one can estimate this group to include 11.5% of the elderly;

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Kinesiological Analysis of Dental Techniques for Dental Entrance Testing

LESLIE E. LATNER, B.S., M.S., D.M.D.
RICHARD M. DIEMER, D.D.S., Ph.D.

At the present time, the American Dental Association's Division of Educational Measurements of the Council on Dental Education is administering the Dental Admissions Test (DAT) to all individuals applying to a dental school in the United States. Within the past few decades, the dental profession has earned increased esteem among the health professions, resulting in the application of thousands of America's young people to dental schools. Due to the extreme competition for admission, and in order to maintain their standards of excellence, dental schools must select their students with as much care as possible. In addition, a dental school has a financial investment in every student and would suffer accordingly if one were lost from the educational program.

The Dental Admissions Testing Program was instituted to assist admissions committees in the selection of students most likely to succeed, based upon test results, in both the cognitive and psychomotor aspects of an undergraduate dental school curriculum. Since the beginning of the DAT Program in 1950, assessment of success in dental technical abilities has been accomplished with two component subtests, carving dexterity and spatial relations. The ability to predict success in dental techniques with these tests, based on different studies by Dworkin,[1] Kreit and McDonald,[2] Manhold and Manhold,[3] was never firmly established. Beginning in October, 1972, the Perceptual-Motor Ability Test (PMAT) was substituted for the chalk carving and spatial relations tests as the predictor of a dental

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student's technical ability. By 1974, no clear data had been presented, although indications were that the PMAT had not been sufficiently validated as a predictor of student ability to perform dental techniques.[4]

In a factor analysis of the PMAT, Zullo employed the Purdue Pegboard Assembly, the Both Hands Test, the Crawford Small Parts Dexterity Test, the O'Connor Finger and Tweezer Dexterity Test, and the Minnesota Spacial Relations and Paper Form Board Tests to establish and validate different factors believed to be involved with dental technique.[5] He concluded that task analysis techniques should be used to determine if these different factors were truly important to dental education.

Although studies by Fernández-Pabón[6] and Brigante and Lamb[7] also indicated a need to determine the abilities necessary to perform dental techniques, no study has, as yet, included a task analysis of dental techniques to discover what kinesiological abilities are needed in dental techniques. Based upon past experience, it would seem that, as a group, dental educators have been somewhat unsure of exactly what they should be measuring in a test of dental technical ability.

The purpose of this investigation, then, was to use a job or task analysis technique to determine the kinesiological, i.e., human movement abilities, necessary for success during the acquisition of dental techniques.

METHOD

The participants in this study were 39 faculty members from the dental schools of Loma Linda University (LL), University of California, Los Angeles (UCLA) and the University of Southern California (USC). They represented the Departments of Operative Dentistry, Removable Prosthodontics and Fixed Prosthodontics.

The first stage of task analysis was to identify those specific elements that are critical to the successful completion of dental technique work. In the second stage these elements were then used in the formulation of broader categories for the basis of an overall, kinesiological classification system. These elements were derived from observations of the investigator and a small panel of experts, as well as from a review of the literature.

After the panel of experts agreed upon the elements, the basic categories and the resulting classification system, the system was then transposed into a questionnaire. The 37 items of the questionnaire included such categories as vision, strength, multiple

limb coordination, speed, dexterity, precision, steadiness, pressure discrimination, kinesthesis, neatness, other non-visual senses and grade point average. Also, at the end of the questionnaire, there were two short-answer items about prior manual experience and in-coming level of manual skill as prerequisites for satisfactory performance in dental techniques.

The questionnaire form was subsequently administered in person to each of the 39 faculty members by the investigator. The form itself was of the modified Likert type, in which the participant was asked to rate each item on a scale from 0 to +, where 0 indicates that superior technique work can be done with absolutely *no* degree of this ability, and where + indicates that it is essential to have an exceptionally *high* degree of this ability to perform superior dental technique work. For purposes of scoring, a numerical template was later placed over the participants' responses, so that 0 to + was represented by 0 to 10, respectively. The template was used for all questionnaire items and was never seen by the participants.

RESULT

Based upon the 39 respondents, there were 18 questionnaire items on the 0-10 scale (See Table 1) that were considered to be *highly* important in the performance of dental technique work: correctable 20/20 vision and manual dexterity with small objects (8.9); visual acuity, depth perception, fine control precision, finger dexterity and finger-pressure sensitivity via instruments (8.8); surface-contour matching via instrumentation (8.7); spatial visualization (8.6); steadiness without movement and neatness (8.5); visually planning ahead and arm-hand steadiness (8.4); direct finger-pressure sensitivity (8.2); direct surface-contour matching (7.6); visual tracking of stationary objects (7.5); wrist manipulation (7.4); and visual tracking of moving objects (7.3).

There were 15 items (See Table 1) that were thought to be moderately important in the performance of dental techniques: multiple-limb coordination and steadiness during movement (6.9); internal pressure sensitivity, i.e. kinesthesis (6.8); color-sightedness (6.7); finger strength (6.3); moderate grade-point average (6.2); manual dexterity with large objects (6.1); grip strength and high grade point average (5.8); work speed (5.6); wrist strength (5.2); speed of movements (5.0); elbow strength and hearing (4.7); and shoulder strength (4.5).

There were 2 items (See Table 1) that were felt to be only somewhat or slightly important in the performance of dental technique work: arm

strength (4.2); and low grade point average (3.6).

Finally, there were 2 items (See Table 1) that seemed to possess very little or no importance in the performance of dental techniques: smell (2.2) and taste (.84).

For the two short-answer items, previous manual experience, particularly in dentally-related activities, was generally viewed as having some importance in preparing for dental technique work. The important manual skill prerequisites that were mentioned, included factors such as visualization of spatial relations, fine motor control, visualization of an end result, adaptability, proper attitude, visual cue abilities, and motivation.

DISCUSSION

EXTERNAL, NON-VISUAL SENSES (Hearing, Smell, Taste). Hearing was one item rated as moderately important. The ability to hear properly is significant in the operation of the dental drill, since auditory feedback from the drill indicates the number of revolutions per minute, and, therefore, the effectiveness of the bur as a cutting instrument. In view of the findings, a student applying for dental school should have normally good hearing. Smell and taste were viewed as having no importance and need not be included as test items.

COLLEGE ACADEMIC PERFORMANCE (High, Moderate, Low G.P.A.). These three items were rated as being moderately to slightly important for dental technology. Ratings for both high and moderate grade point averages were moderately important, reflecting the instructor's opinion that a grade point average probably gives an indication of student's ability to learn, rather than an indication of his manual skill level. In keeping with the data, a prospective dental student's G.P.A. should not necessarily be viewed as an indication of his motor skill ability.

VISION (Correctable 20/20 Vision, Color Sightedness, Visual Planning, Rapid Identification of Detail, Acuity, Tracking of Visualization, Depth Perception). Both correctable 20/20 vision and color-sightedness were rated as important. The rating of importance for correctable 20/20 vision was very high, indicating that it is essential to the performance of dental procedures. Color sightedness was only rated as moderately important; a student could, therefore, perform technical services even if color blind. Based on the data, a strong recommendation is made to obtain validation that a prospective dental student has correctable 20/20 vision. A color sighted test is also recommended.

TABLE 1. - SUMMARY OF SCALE SCORES

ITEM	SCHOOL MEAN LL(N=15)	UCLA(N=18)	USC(N=6)	TOTAL MEAN	ST. DEV.
Hearing	3.8	5.2	5.3	4.7	2.70
Smell	1.4	2.9	1.7	2.2	1.81
Taste	1.0	0.8	0.5	0.8	1.03
High G.P.A.	5.2	6.2	6.0	5.8	1.01
Moderate G.P.A.	5.9	6.8	4.8	6.2	2.27
Low G.P.A.	4.7	3.2	2.2	3.6	2.76
Correctable 20/20 Vision	8.5	9.2	9.0	8.9	1.34
Color-Sightedness	6.2	7.2	4.3	6.4	3.28
Visually Planning Ahead	8.5	8.1	8.3	8.3	1.26
Visual Activity	8.9	8.8	8.7	8.8	1.11
Visual Tracking Moving Objects	7.6	7.8	4.8	7.3	2.52
Visual Tracking Stationary Objects	7.6	8.2	4.8	7.5	2.08
Spatial Visualization	8.3	9.1	7.8	8.6	1.40
Depth Perception	9.3	9.3	5.8	8.8	1.82
Arm Strength	5.0	3.4	4.8	4.3	2.44
Wrist Strength	5.5	4.6	6.5	5.2	2.45
Finger Strength	6.1	5.8	8.3	6.2	2.95
Grip Strength	4.6	6.3	6.8	5.7	2.03
Elbow Strength	4.5	4.7	5.2	4.7	2.39
Shoulder Strength	4.6	3.8	6.5	4.5	2.46

TABLE 1. - SUMMARY OF SCALE SCORES (CONT'D)

ITEM	SCHOOL MEAN LL(N=15)	UCLA(N=18)	USC(N=6)	TOTAL MEAN	ST. DEV.
Multiple-Limb Coordination	6.3	7.8	5.8	6.9	2.82
Speed of Movements	4.4	5.1	6.3	5.0	2.31
Work Speed	5.3	5.7	5.8	5.6	1.72
Fine Control Precision	8.5	8.9	9.0	8.8	1.13
Manual Dexterity With Large Objects	6.1	5.6	7.5	6.1	2.76
Manual Dexterity With Small Objects	8.3	9.3	9.3	8.9	0.92
Finger Dexterity	8.7	8.7	9.2	8.8	1.49
Wrist Manipulations	7.1	6.9	9.0	7.3	1.67
Arm-Hand Steadiness	7.5	8.9	9.2	8.4	1.16
Direct Finger-Pressure Sensitivity	7.3	8.6	9.0	8.2	2.03
Finger-Pressure Sensitivity via Instruments	8.3	9.2	9.3	8.8	1.30
Surface-Contour Matching via Instruments	8.9	8.7	8.3	8.7	1.15
Direct Surface-Contour Matching	7.7	7.4	8.2	7.6	2.61
Steadiness Without Movement	8.1	8.6	9.0	8.5	1.29
Steadiness During Movement	8.1	9.2	6.0	8.3	1.88
Kinesthesis	5.7	7.4	7.8	6.8	2.40
Neatness	8.5	8.4	8.5	8.4	1.37

In addition, the data indicate that the abilities to visually plan ahead, to rapidly and accurately identify visual detail (visual acuity) to make visual, tracking adjustments to changes in speed and direction of both moving and stationary objects, to recognize changes in the position of an object (spatial visualization) and to distinguish between near and far objects (depth perception) are all highly important for an adequate foundation in technical work. They should be considered in the planning of a dental entrance test to measure manual skills.

STRENGTH (Arm, Wrist, Fingers, Grip, Elbow, Shoulder). Wrist and finger strength were rated as moderate in importance for dental procedures. Finger strength was considered more important than that of the wrist (and much more important than that of the arm). The data indicate that both finger and wrist strength should be considered in dental entrance testing. Strength of the arm is much less important.

Strength of the grip was rated moderately important, midway between the ratings for finger and wrist strength; it takes the combination of both of these abilities to possess grip strength. Strength of the grip, then, should be included in the entrance testing for manual skills.

Elbow and shoulder strength were rated as barely moderate in importance. Comments indicated that any endurance required at these two anatomical joints could be acquired during dental education. Over-all, the data indicates that these two items need not be considered essential, and warrant less attention when considering a testing battery.

PSYCHOMOTOR ABILITIES (Multiple Limb Coordination, Speed, Fine Control Precision, Manual Dexterity, Finger Dexterity, Arm-Hand Steadiness, Finger-Pressure Sensitivity, Surface Contour Matching, Steadiness). Multiple limb coordination was rated moderate in importance. The data indicate that multiple limb coordination should be given serious consideration as an ability that requires testing in a dental manual skills examination. Both speed in working and speed in movement were rated as being only moderately important. Instructors pointed out that speed of movement was not particularly important, and that speed in accomplishing the work would come to the student with practice. The data along with the comments indicate that these two abilities need not be considered for entrance testing purposes. The data indicate that fine control precision is a highly important ability in dental procedures. All three groups of instructors gave a high rating to this ability. Based on the data, it is recommended that this item be seriously considered when constructing an entrance test to predict success in technical services.

The skillful movement of large objects was rated as moderately important while the skillful movement of small objects was rated as one of the most important factors. The data show that the skillful movement of large objects should be considered in planning an entrance test. However, the skillful movement of small objects is strongly recommended as an ability requiring testing to predict later success. Finger and wrist dexterity were rated highly in importance. Instructors indicated that finger dexterity was extremely important to success. The data indicate that both items should be considered in planning an entrance test. In general, arm-hand steadiness was also rated as highly important and should be included in testing.

The discrimination of pressure intensity both directly upon the fingers and through instruments upon the fingers was rated highly important. Faculty expressed the feeling that while direct finger pressure sensitivity is quite important, finger pressure sensitivity via instruments is somewhat more important and critical to a dentist. From the ratings and comments, it is quite clear that these two abilities should be considered in the planning of an entrance test. Both surface-contour matching i.e. palpation, with fingers and with instruments were rated highly important. Again, the instructors rated this ability with instruments as a more desirable factor than with the fingers alone. The data indicate that both items warrant serious consideration as abilities needing to be examined in a dental manual skills test. Holding steady without movement was rated as highly important and steadiness during movement was considered moderately important. In keeping with the ratings, the general ability to maintain steadiness should be strongly considered in planning an entrance test.

KINESTHESIS. Kinesthesis was rated moderately important. There seemed to be some confusion among the instructors about this item; some did not fully understand the concept. One comment was that only visual feelings or cues are needed by the dentist. However, previous items show that palpation and certain components of kinesthesis, e.g. finger-pressure sensitivity, are important. Based on the ratings from other items, along with the response on this item, it is recommended that kinesthetic responses be completely explored when planning a manual skills dental entrance test.

NEATNESS. Neatness was rated by the instructors as highly important. In keeping with the ratings, neatness should be considered in the development of a dental manual abilities test.

ESSAYS. "Is a person's past experience in working with his hands important for preparation in dental technique work?" The general

opinion from all three groups was that experiences in working with one's hands would be important in the preparation of a student for dental practice. Therefore, somewhere in the entrance procedures, the background of the student's experiences in working with his hands should be obtained. "Please give a short description of the manual abilities a beginning student needs to perform the fundamental skills of dentistry." Since this was such a broad question, many different answers were obtained. One comment frequently mentioned was that such abilities would be those items drawn from this questionnaire rated in the moderately important and highly important categories. The indisputable fact elicited by this question is that manual skills are vital in dentistry and that such abilities for prospective dental students must be identifed.

CONCLUSIONS

1. A task or job analysis seems to fulfill or approximate the methodological requisite for the determination of this study.
2. Prior experience requiring fine motor patterns would be important in the preparation of a student for dental technique work. However, this experience should be similar to dental techniques.
3. Correctable 20/20 vision is an essential requirement.
4. The cognitive ability to visually plan ahead is required for a foundation in dental technology. With this ability, a student will be able to perform quite well given the other abilities to an average degree.
5. Visual acuity, spatial visualization, and depth perception are all-important in the performance of technique work. It should be noted that all faculty that responded to the questionnaire felt strongly about the relative importance of these abilities so that the ratings were all quite close.
6. Fine control precision is important in the performance of dental procedures. However, the speed at which one works is a factor that is improved with practice and need not be included in an entrance test.
7. Skillful, steady, controlled manipulations of arm-hand movements is required in the performance of dental techniques.
8. Finger-pressure sensitivity through instrumentation is more important than directly through the fingers, although the latter is still an important consideration.
9. Surface-contour matching in dentistry is an ability related more to instrumentation rather than directly with the fingers.

10. There is a definite need to develop a good, predictive test of manual abilities since technical skill is so essential to the practice of dentistry.

IMPLICATIONS

In view of the limitations of this study and of the conditions involved, it is recommended that:

1. A complete taxonomy of abilities required for the performance of dental techniques should be developed.
2. The abilities introduced in this study should be subjected to critical analysis and evaluation to assess their merit.
3. Only after each ability required for dental techniques is identified can a mechanism be constructed to test these abilities. Later, after tests are validated, the entire test battery can be administered to determine if success in dental technique work can be accurately predicted.
4. Certainly, this study has implications toward modifications in the DAT, so that it can better predict a candidate's technical manual ability related to those needed in dental techniques.
5. Other health professions that require fine motor movement of students (e.g., medicine, medical technology, dental assistants) should consider the abilities to be used in a valid entrance test.

ACKNOWLEDGEMENTS

The assistance of Drs. Richard P. Barthol, Bryant J. Cratty, Laurence E. Morehouse, Kenneth C. Trabert, and Robert B. Wolcott in the development of this study is gratefully acknowledged.

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(continued on page 244)

Values held by patients and dentists are important to understand. The process of values clarification helps students understand their own values. Two case studies documenting the teaching of values and the utilization of the process of values clarification during a dental education are presented. The data collected indicate that students appeared to reassess their prior assumptions regarding dentist-patient relationships. Most students rated the program material, the importance of the material, and the overall value of the sessions as good or better.

Values clarification along with a clear understanding of values may be helpful for students who wish to have a better understanding of themselves and their patients.

Values Clarification in Dental Education

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To adequately prepare dentists to deal with value related issues, exploration of their own attitudes and value is essential. Values clarification is a unique tool which may be employed during dental education to focus students' attention on the valuing process. The process of values clarification has been utilized in educational programs with varying results.[1-9] For example, Sonnenberg and Hildebrand were successful in incorporating values clarification exercises into psychiatric clinical rotations. Students gained insight which aided in clinical judgements pertaining to psychiatric issues.[8] Blokker et al claimed success in a drug abuse program utilizing values clarification. The

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decision making ability, overt self-reliant behavior, and belief in personal control (females only) of their subjects were improved.[1] On the other hand, Weber found no differences between lectures and values clarification in teaching health education.[4]

Although documented in other disciplines, this technique has not been reported in the dental literature. This manuscript reviews values and values clarification, and presents two case studies describing the application of values clarification in dental education.

VALUES

People hold values which are reflected as internalized convictions. These convictions, whether conscious or not, are referred to as values; they are slow to form and slow to change. The development of a normative value system is influenced by societal pressures, as well as significant others surrounding the individual. Values are generally adopted and acted upon prior to a clear understanding. Knutson argues that values are: "What one feels one should do, ought to do, or must do whether or not one is consciously aware of what is giving direction to the thoughts and actions."[10] Kluckhohn adds that they are "referable to standards, personal or cultural, that do not arise solely out of immediate tensions or immediate situations."[11] Owing to their nature as standards, they are considered one of the major determinants of behavior.[12] Therefore, the way people behave is a function of their values. Since behavior is governed by the values that are held, behavior can be observed in order to better understand the individual. It follows that studying values is important for dental students or, in fact, anyone interested in dental health education.

A value system is among a person's most important possessions.[13] Attempts to impose change on socially accepted value systems will usually meet with strong resistance, while deviance in behavior generally leads to sanctions. Haynes and Matthews present four rules to consider prior to making attempts to change a person's values. These rules may be applied to the dental situation in the following manner:

1. The dentist must be aware of his own values and how they affect his choices in planning for and implementing changes in dental behavior.
2. The dentist must understand the values held by the patient before planning a dental health education program. Values may be inferred from behavior by listening intently, actively, and sensitively.

3. The dentist must not impose his values or related behaviors on a patient that has an established system of normative values that might be different. In order to make changes, the dentist may have to shift his attention to significant reference groups that sanction normal behavior and have the power to modify norms.
4. The methods of change and the degree of success is determined in part by the degree of "fit" of the advocated change with the internalized normative value system.

VALUES CLARIFICATION

Up to this point, this review has dealt with the study of end-states of existence or terminal values. The school of thought founded by Dewey prefers to study the modes of conduct or instrumental values.[14] He asked whether the fact that "an attitude was prizing" was a sufficient condition for the existence of values or whether a further "condition of the nature of valuation or appraisal was required."[15] Raths et al have built upon Dewey's implications of values development a theory of values which seems to offer concrete and effective aid to teachers.[16] Their contention is that it is more important to speak of the process of valuing than of values as end-states of existence. Values are based on three processes: *choosing*, which can be divided into choosing freely, choosing among alternative; *prizing*, which is divided into prizing and cherishing, and affirming; and *acting*, which is broken down into acting upon choices, and repeating. These processes collectively define value. The results of the valuing process are called values. The concern is with the process that a person uses to develop a value rather than defining the value. Their concepts have been termed "values clarification." Values clarification then, is a procedure or process by which a person defines or clarifies existing values. If the values are found to be inappropriate, incongruent, or inconsistent, they may be changed.[14] Gelatt et al state that values are learned, therefore, "They are appropriate subject matter for the classroom. Students will be better educated, more competent, and more independent if they learn the sources of values, how values are acquired, the values of other people, and respect of differing values."[17] These authors, as well as Simon et al,[18] Westerhoff and Simon,[19] and others have published extensive classroom exercises that attempt to aid the student in the process of values clarification.

Although certain behaviors and attitudes, such as; aspirations, feelings, interests, beliefs, activities, worries, and convictions approach values, they are too transitional and thus are not considered values. These terms are more appropriately referred to as value indicators.

They are helpful to students during the values clarification process. Prior to a program utilizing values clarification, a broad information and conceptual level should be established so that the learner will have an adequate base upon which to build.[20]

From this discussion, it may be inferred that there are many potential uses of values clarification in dental education. These processes have been utilized during two courses at the University of Mississippi School of Dentistry.

Case 1—The Use of Values Clarification: Poor Oral Hygiene.

One of the goals of this first year course was to introduce freshman dental students to the concepts of dental health education, primary prevention, and means of resolving the problem of poor oral hygiene. In order to accomplish these goals, a program containing discussions and exercises dealing with values and values clarification was developed.

The discussions centered on the theoretical and practical nature of values. A synchronized slide-tape presentation depicting the conflicts in values in American society, among health and other competitors for the dollar, was presented to trigger discussion. Following the establishment of a conceptual base, a values clarification exercise was introduced. The exercise dealt with rapid decision making based on scanty information. Although scanty, the information provided enough data for the student to form opinions based on their own value systems. Students worked in small groups to arrive at mutual decisions. After presentation of these decisions, intensive discussion were conducted. Students began to recognize the differences that exist in their own rather homogeneous group. This led to the variances existing within the general population, and between the dentist and patient.

In general, students found the sessions and exercises enjoyable. They commented that it was a nice break from the stand-up lecture. They felt that they learned about themselves and that their ability to understand and relate to their patients will be improved as a result of this program.

Case II—The Use of Values Clarification in the Exploration of Humanistic Dimensions of Dental Practice

The goal of this program was to engage senior dental students in an in-depth exploration of their personal assumptions and values regarding humanistic dimensions of dental practice. Humanistic dimensions were taken to include the qualities of empathy, respect, compassion, sharing, and interdependence. The objective of the program was not

to elicit a change in the students' attitudes of values, but rather to encourage them to consider how their values had been arrived at and how strongly they were held.

The educational experience consisted of four, two hour sessions. During the first session, the course objective was explained and a pre-test questionnaire administered. The pre-test was used both to rate the students (N=21) on the dimension of humanism, as well as to provide a basis for later group discussion. The largest percentage of students chose what were considered humanistic responses on 9 of 19 possible items. During the second and third sessions the students were engaged in open ended discussions that centered on humanistic aspects of medical and dental practice and the educational experience. Both of these sessions were designed to engage the students in an implicit consideration of their own value system. At no time was any particular point of view stressed as being the preferred approach. Rather, students were encouraged to explore and challenge each other's assumptions and values. This process enabled students to bring to the surface and examine the tacit assumptions that had been governing their patient interactions. This aided in the realization that often their assumptions about people had led directly to a pattern of interaction which both resulted in and was a product of their formalized patient-student relationships.

The general content areas covered during these two sessions were:

1. The concept of masculine and feminine principles as it applies to the practice of dentistry in general and the prevention of oral diseases specifically;
2. The contrast between active caring and receptive caring, objective reality and subjective reality, and curing and healing;
3. The students' personal appraisal of the relevance of a humanistic dental practice in achieving positive patient health outcomes and provides satisfaction; and
4. The students' interpretation of the realistic and ideal function of a dentist.

During the fourth session, the students' consideration of their own value system was made explicit by the use of a formal values clarification exercise. Each student was asked to construct a Values Grid[18] for several of the general issues identified in the pre-test as either showing good response variability across the class or extreme class divergence from the humanistic position. In addition, the student was to summarize his/her position and answer specific questions on each issue. Students were then divided into small groups. Each

student was called upon to discuss his/her position on one or more of the issues, and how it met each of the seven valuing processes. It was made clear that they were not being asked to defend their positions, but rather to evaluate how they had been arrived at and how firmly they were held. By doing this, the students were able to see that few of their beliefs fulfilled all seven of the valuing processes. This encouraged many of them to reexamine some of the attitudes and values that had been controlling their interpersonal relationships.

Students' comments indicated that the program was successful in facilitating the evaluation of their own value system. Some students indicated an increased willingness to reexamine their former assumptions about dentist-patient relationships. It would be unrealistic to expect such a brief educational experience to bring about a meaningful shift in students' attitudes or values. Nevertheless, a post-test demonstrated significant movement in the students' responses to the questionnaire indicative of at least an intellectual reassessment of their prior assumptions (Wilcoxon Matched-Pairs Signed-Ranked Tests: $T = 5$, $N = 18$; $p > .01$). A formal course evaluation indicated that the program was moderately successful, with approximately 60% of the students rating the course 3 or better on a scale of 1 to 5 in the dimensions of: overall evaluation, session materials, and session value.

CONCLUSION

During values clarification exercises, students respond from varied belief systems and experiences. Consensus is not a goal of these exercises, nor is one of the objectives to teach an answer. The goal is to reveal the complexities of the issues and to provide examples to stimulate the development of interests beyond the classroom.[21]

The literature offers conflicting success with this process.[1–8] Although the cases studied in this report indicate success, it must be cautioned that the success may be short term. Furthermore, the process of values clarification lacks an operational concept of values. It assumes feelings, needs, and preferences are equivalent to values; and it does not allow students to understand how values influence behavior. Feelings, needs, and preferences exist in the process, but how they come from values, or how values are affected by one's societal and physical milieu is overlooked.[22] Nevertheless, so long as these caveats are understood, the process of values clarification may be a useful tool to use during a dental education.

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Extramural Experience in Learning Dental Office Management

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A persistent need exists in many schools for expanded knowledge and skills in dental office management[1,2]. Curriculum courses have been designed with varying success using both intra- and extramural activities to meet this urgent need of the new graduate entering practice.

One means of practical instruction of senior dental students which has been in progress at Case Western Reserve University School of Dentistry is an Office Visitation Program. Gardiner and Lotzkar have pointed out that a well-designed extramural experience that is carried out effectively, and which involves students with clear objectives, will provide beneficial experiences[3]. Soble likewise recognized the practical learning values of extramural programs[1].

BACKGROUND

The Case Western Reserve University School of Dentistry in 1974 conducted a survey to determine the types and objectives of extramural teaching of students at fifty-eight dental schools. Twelve of the thirty-five respondent schools stated that they had some form of office visitation program. Four others had abandoned such projects and two schools indicated that they had programs only at the graduate level. However, many schools simply did not have a program to involve students in office visitations.

The National Dental Curriculum Workshop held March 30 to April 1, 1977 developed several pertinent recommendations. One recommendation[4] indicated the need for, and desirability of, a program structured to provide guidance to students through office visitations. The objective was "to improve instruction in the broad area of practice

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management so that the gap between school and the real world of practice is reduced."

Another recommendation in this Workshop's Report[5] declared, "Dental schools should evaluate the adequacy of their current program offerings in areas of practice management skills and effective communication with patients."

The School of Dentistry reviewed the programs described by schools which had developed office visitation projects. Using the experiences described, a program was planned to address the needs of students at this level.

PRELIMINARY PROGRAM CONSIDERATION

The School approached the development of its Office Visitation Program with a survey of third-year dental students. This survey sought information to determine the following elements essential to the project design:

1. How much interest was there in such a program?
2. In what school year did the students believe the program would be most advantageous?
3. Should the program be optional or mandatory?
4. What categories of observations, in the opinion of the students, would be of most value?

THE PILOT STUDY

Based on the results of this initial survey the School set up a pilot study program. Objectives of this study were to:

1. Determine the feasibility of conducting an office visitation program within the constraints of the current curriculum.
2. Assess the need for setting minimal standards on requirements for student participation.
3. Evaluate the response of students to participation.
4. Evaluate the reactions of the participating dentists to use of their offices
5. Estimate the potential educational value of the program to the student.

The pilot study involved faculty members and students. Faculty members responded well to a letter asking them to participate. The response of the part-time faculty provided a variety of types of practices to ensure a workable program. Twelve student participants were selected from a pool of volunteers based on their acceptable clinical and didactic class standings. An important consideration in all

selections was the ability of each participant to observe and to report on his/her responses to the objectives set forth above. Responses received led to modifications in the pilot program and were used as the basis for the development of an ongoing visitation program.

OFFICE VISITATION PROGRAM

The present visitation program is offered as an option to all senior dental students. Program participants make at least two visits of one-half day each to two private dental offices. Offices are selected from facilities volunteered for the program by members of the Cleveland Dental Society. Selections are made from offices of host-dentists in solo, partnership or group practices and include both general and specialty practices.

The program includes preliminary and follow-up seminars with students and the host-dentist participants.

A preliminary seminar is held with groups of ten-to-fifteen students. The purposes of this seminar are to inform students of the specific objectives of the program, discuss the operational mechanics of the program's activities, discuss the group's deportment and decorum during visitations, distribute and discuss the checklist (Figure 1) concerning observations, and distribute schedules assigning students at specific times and dates to the offices of participating dentists.

The checklist which is used to structure the observations of important elements has been developed to assure data compilation by each student which can be evaluated at the postvisitation seminar. This checklist is a valuable means for developing tangible values from each visitation.

A preliminary seminar is held separately for the dentists participating in the program. The objectives of the program are discussed thoroughly. Copies of the checklist are distributed and discussed. The participants are very interested in assisting the school in its extramural educational objectives. Most of the dentists feel that the program provides students with information of substantial value in their new practices.

The office visitation periods are of great interest to the students. They find it an intriguing experience to see how actual practitioners in the real world handle their office problems and decisions, and how they relate to their patients. The processes in operating an office become actualities under observation by students who shortly will need to make costly decisions which affect their own future practices. Students recognize that they need to know more about principles of

Student_____ Dentist_____

	YES	NO
A. TYPE OF OFFICE		
1. Solo		
2. Group		
3. General Practice		
4. Specialty (type)		
5. Urban		
6. Rural		
7. Suburban		
B. PHYSICAL ASPECTS OF OFFICE		
1. Location		
a. Professional Building		
b. Separate Building		
c. Store Front		
d. Combination Home and Office		
e. General Office Building		
f. Other		
2. Number of Operatories		
a. One		
b. Two		
c. Three		
d. Four		
e. Five or more		
3. Operatory Equipment		
a. Sit-down Dentistry		
b. Stand-up Dentistry		
c. Combination of Sit-down/Stand-up Dentistry		
d. Multiple Operatories Similarly Equipped		
e. Hygienist Operatory		
4. Other Physical Features		
a. Separate Laboratory		
1) Lab Work Done Here		
2) Minor Lab Work Done Here		
b. Separate X-Ray Processing Room		
c. Separate Sterilizing-Make Ready Area		
1) Dry Heat Sterilization		
2) Autoclave "		
3) Hot Water "		
4) Cold "		
d. Separate Business Office		
e. Consultation Room		
f. Private Reception Room		
g. Shared Reception Room		
C. BUSINESS ASPECTS OF THE OFFICE		
1. Personnel		
a. One Assistant (Chairside)		
b. One Assistant and Receptionist		
c. Two or More Assistants and Receptionist		
d. Hygienist		

Figure 1 - Checklist for Office Visitation Program
(First two pages)

	YES	NO
e. Other (Specify)		
f. Associated Dentist(s)		
g. Training Manual		
2. Accounting and Office Procedures		
a. Billing by Office Personnel		
b. Computerized Billing		
c. Other Type		
d. Itemized Billing		
e. Vertical Files		
f. Horizontal Files		
g. Work Sheets Used		
h. Recall System		
1) Phone Recall		
2) Mail Recall		
D. PATIENT MANAGEMENT		
1. Seen First by Dentist		
2. Emergency Time Available		
3. Complete Examination		
4. Major Complaint Treated First		
5. Patient Education		
6. Audiovisual Aids		
7. Case Presentation		
a. Fees Presented Before Treatment		
b. Fees Presented in Private Office		
c. Credit Standing Investigated		
d. Payment Plans Presented		

	YES	NO
8. Preventive Program Utilized		
9. Patients Referred to Other Offices for Specialized Treatment		
E. OTHER ACTIVITIES OF THE DENTIST		
1. Member of Dental Society		
2. Member of Dental Fraternity		
3. Member of Other Fraternal Order		
4. Member of Faculty of Dental School		
5. Active in Community Affairs		
6. Active Hobbies		
7. Continuing Education Participation		

F. Comments - Please make any additional comments and observations below.

Figure 1 - Checklist for Office Visitation Program
(Second two pages)

practice management. This "need-to-know" is reflected in the students' attitudes and interest in the Office Visitation Program.

In a typical office visitation the student is greeted by the host-dentist and a short initial conference is held. The dentist discusses his/her type of practice (solo, partnership, group, etc.) and elements in the practice as they relate to the management elements on the checklists. The student at this conference makes entries on his/her checklist and asks questions of a general nature. The dentist or the chief assistant conducts a brief tour of the facilities.

After the tour, an informal visit by the student to the operatories and/or business section of the office is made. The student is free to ask questions and to complete checklist data.

Before departure, a second brief conference is held with the host-dentist. Questions are asked and answered, and final data entires on the checklist are made.

POSTVISITATION SEMINAR

The postvisitation seminar involves lively discussions in which students share their analyses and reactions to the information received and the specific observations made during each visitation. The completed checklists prove valuable for this purpose. Impressions and opinions shared can be changed or modified to some degree by discussions of mutual experiences. The overall purpose of the Office Visitation Program, i.e., to collect a basis of data on the practicalities of office management, is restated at each postvisitation seminar.

EVALUATIONS

The program has been evaluated on a continuous as well as on an intermittent basis. At the end of the postvisitation seminar each student was asked to complete a questionnaire (Figure 2) reflecting his/her conclusions as to the learning experienced during the visitatons. Questionnaires were distributed to all students who had participated in the pilot program, as well as in the regular Office Visitation Program which followed.

Forty-nine questionnaires were distributed, with thirty-two responses. The results were as follows:

1. All respondents thought the program should be continued.
2. Three thought the program should be modified. Suggested changes were incorporated into subsequent program sessions.

The degrees of personal benefit derived from the program by the respondents are shown in Figure 3. These evaluations reveal a number

	YES	NO
1. Do you feel that the Office Visitation Program as you experienced it should be continued?		
2. Do you think that the Office Visitation Program should be modified?		

3. If answer to #2 is Yes please describe suggested changes.

_____

_____

_____

_____

_____

_____

The Program was of benefit to me in the area of:	A Great Deal	Significant Amount	A Little	Not At All
4. Selection of office location				
5. Physical set-up of an office				
6. Selection of office personnel				
7. Selection of equipment				
8. Office accounting procedures				
9. Recall system				
10. Case presentation				
11. Preventive program				

Figure 2

Evaluation Questionnaire on Office Visitation Program

The Program was of benefit to me in the area of:	A Great Deal	Significant Amount	A Little	Not At All
Selection of office location	0	2	12	16
Physical set-up of an office	15	12	4	1
Selection of office personnel	2	23	5	2
Selection of equipment	11	20	1	0
Office accounting procedures	16	8	7	0
Recall system	4	17	7	3
Case presentation	9	19	1	3
Preventive program	8	18	4	2

Figure 3

Personal Benefits from Office Visitation Program

of interesting reactions by the students. Most felt that the visitations had little or no value in selecting an office location. Probably these particular evaluations were due to the students' prior decisions on office locations. In all of the other categories the students registered definite approval of the training benefits provided. An example of these opinions can be seen in the favorable responses of the majority of the students. As to the question on physical set-up of the offices visited: Thirty-one of the thirty-two respondents stated that the program improved their knowledge substantially. Only one indicated a choice in the "not-at-all" category.

On the survey questions concerning the selection of equipment and office accounting procedures there were strong conclusions that the knowledge gained would be useful in establishing a dental practice. The responses on recall systems, case presentations and preventive programs indicated that significant or greater amounts of knowledge had been gained by about 74% of the students replying.

The program evaluations shared by students at the postvisitation seminars have been frank and valuable as a learning experience. The postgraduation survey questionnaires have further confirmed the practical values of this program to the recent graduate.

A postvisitation seminar attended by each participating dentist whose facilities have been visited in the program has provided valuable insights as to possible changes in the program which would improve the content or teaching approaches used.

In conclusion, through its evaluations, the School has been led to a firm conviction that the program's experiences provide meaningful knowledge and meet a definitive need of its students.

SUMMARY

1. An Office Visitation Program was devised to fill a need by senior students to gain a basic knowledge of office management through direct contacts with the real world of dental practice.

2. A pilot study led to findings that reinforced the perception of this need for learning through pragmatic experiences.

3. The Office Visitation Program was designed to incorporate the results of the pilot study with other related elements.

4. The Office Visitation Program involved preliminary and post-visit seminars with students and participating dentists, arrangements for visits, development of educational objectives and instructional approaches, to achieve maximal learning.

5. Evaluations of the program by students and graduates of the School have provided continuous updated feedback on the value and necessary changes relating to the program.

6. Evaluations of the program are aided through discussions with the staff and the participating dentists, which produce modifications in its structure and content.

7. The program fulfills the recognized need of students for practical experiences in the area of office management.

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A Review of Health Maintenance Organizations with Implications for Dentistry

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The evolution of Health Maintenance Organizations*, stems from political, economic, and social factors associated with what is termed the health care crisis. The health care crisis is characterized by several factors: an alleged shortage, maldistribution, and inappropriate ultilization of professional manpower; an imbalance between primary providers and specialists; the accelerating costs associated with health care; and the variation in the health status among different groups within our population. The escalation of these concerns by prominent politicians, the news media, labor organizations, business organizations, and consumer activists, together with the seemingly uncontrollable costs of Medicare and Medicaid, provided the catalyst which enabled Congress to adopt legislation for Health Maintenance Organizations.[1]

The Health Maintenance Act of 1973, PL 93-222, authorized $325 million over a five-year period for HMO development. This represented the government's attempt to provide an alternative health care system to socialized health care, and our traditional fee-for-service health care system. The major thrust of HMOs is ambulatory care. They stress preventive and maintenance care in a controlled health care environment, where salaried professionals receive increased benefits for keeping the people enrolled under contract, healthy. Increased benefits are derived when the cost of services utilized is less than the collective premium received from the group enrolled.

*The concept of the HMO strategy was developed by Dr. Paul Ellwood, a pediatric neurologist, and supported by HEW career professionals as an approach to control costs of Medicaid and Medicare.

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HMOs render a stated range of health care services agreed upon in advance, to a specific population for an agreed upon amount of money paid over a defined time period in advance. They may be non-profit-making entities or profit-making. They may be Federally* or non-Federally qualified. To be Federally qualified an HMO must satisfy basic requirements related to services and operations. Service requirements refer to mandated Basic Health Benefits, and Supplemental benefits that may be offered. Operational requirements stipulate open enrollment, non-dismissability of enrollees except for failure to pay the premium, community rating**, and one-third consumer representation at the policy making level of the HMO.[2,3]

The 1973 HMO Act provided HMOs with distinct advantages not enjoyed by providers of the traditional health care system. Marketing prepaid health care was mandated, and employers were compelled to offer HMO plans as an option to traditional insurance plans. The mandated Basic Benefits in the health plan required hospital and physician care, 24-hour emergency care, specialty care, preventive dental care for children, drug and alcohol abuse treatment, and other services creating a package of benefits more enriched than that available with traditional health care plans. Accordingly, the HMO required expensive monthly premiums and a very large enrollment of members to become financially stable. To combat difficulties in securing large numbers of enrollees, the Act required "sound marketing strategy" through advertising.[4] This one provision, allowing for the use of sophisticated marketing techniques, places the traditional health care provider at a distinct disadvantage.

Nonetheless, the HMO Act of 1973 proved difficult to implement and progressed slowly. ***Therefore, the Health Subcommittee of the Senate Labor and Public Welfare Committee met in 1976 to review and amend the Act.[5] The purpose of the session was to correct deficiencies

*Being Federally qualified allows the HMO to take advantage of Federal monies available and enhances marketing capabilities.

**Requires HMO to accept enrollees from specified community regardless of one's health status.

***An investigation by the GAO disclosed that implementation of the Act was impeded by lack of final Federal regulations, the high cost of providing required Basic and Supplemental services, and anticompetitive effect of open enrollment.

in the original law, improve the administration* of the program, and make compliance with the law's requirements more competitive with traditional insurance and health delivery systems.

The amendments which stemmed from the hearings allowed HMOs to exclude preventive dental care for children, delayed community rating for HMOs until five years after becoming Federally qualified, and removed meaningful open enrollment requirements while increasing the availability and level of funding.[6]

The posture of the dental profession regarding HMOs varies considerably. Often little advice is sought from the dental profession during the decision-making processes of health care planning. It is felt that many vital decisions are made by persons least professionally knowledgeable, while those having a greater understanding of reality are ignored and left to assume the responsibilities of unplanned consequences. The futility of screening programs and limited preventive care without follow through services to correct dental disease is well documented.[7] Nonetheless, dental services mandated in the 1973 HMO Act were limited to preventive services.

The level of dental care in HMOs varies from minimal to comprehensive. Of eighteen Federally qualified programs studied in 1976, only five rendered comprehensive services. These were on a fee-for-service basis. It was shown that programs rendering more comprehensive dental services had a service utilization for dental care greater than fifty percent.[8]

Many factors that affect the health care delivery system as a result of medical impact, are not applicable to dentistry. Costs for dental care are more controlled by the profession. Only a minority of dentists are specialists. Most dentists are providers of primary care. Increased hospital and paramedical expenses are not generated to a significant degree by dentists since the nature of practice and utilization of facilities are different.

Even staunch advocates of dental involvement in the HMO concept concede concern and problems that are absent with medical involvement. Integrating dentistry into existing plans causes significant increases in premiums. When benefits are based on individual premium payment, adverse selection of the plan by

*HEW was hampered by significant administrative problems which impeded its ability to implement the law although funds to "qualified" HMO's were being administered. HEW had no central cohesive unit to administer the HMO office, lacked legal personnel to complete written regulations, and lacked necessary specialty personnel due to low salary levels offered.

enrollees may result since persons with large unmet dental needs could join the plan long enough to obtain needed care and then quit. Another problem involves the unresolved issue of whether savings on less duplication of equipment, is offset by the additional specialized personnel required to operate a complex dental care system. Additionally, the relationship of dentists to physicians is not easily resolved. The two professions are almost totally independent. They are covered by different state laws, regulations, and licensing agencies. Lay population attitudes towards dentistry, and the differences in organizational levels of the two professions within the HMO structure, makes it difficult to propose an ideal HMO model.[9]

In a controlled HMO program, where demographic features are known and forecasting is based on sound marketing principles, success should be predictable. Unfortunately, success in theory does not always materialize in actuality. A controlled study[10] on patients enrolled in a prepaid program and fee-for-service program, at the Washington University Medical Center, revealed that ambulatory, diagnostic and preventive services were considerately less expensive to render in the fee-for-service setting. Conversely, hospital costs were less in the prepaid setting, but all savings were offset by higher costs of ambulatory care.

SUMMARY

The HMO concept evolved from a perceived crisis in the traditional fee-for-service health care delivery system. The HMO Act of 1973 was amended in 1975 to enhance its implementation. The HMO Act defined providers, and stipulated through law, measures to assure access to groups of consumers. HMOs are basically structured to fulfill medical criteria. The inclusion of dentistry in HMOs is limited due to numerous factors unique to the dental profession. While it is premature to speculate upon the long term impact of HMOs on the delivery of health care, particularly dental care, HMOs represent an additional health care model that demonstrates hospital cost savings for in-patient care, although the savings are often offset by counterparts rendering ambulatory care.

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Moral Dilemmas of the Multiple Prescription in Dentistry

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The vision which economists often have of man constantly striving to maximize income is surely at odds with the classic image of man the healer. The almost total control which doctors have over definitions of illness and over the selection of varieties and amounts of therapy requires that they put their patients' interests before their own, if they are to be faithful to their calling. Indeed, the primacy of clients' interests is the special moral obligation which distinguishes professional occupations from others.

Among the professions, doctoring is practiced under the severest constraints. Not only must patients' interests come first, but there is often an optimum treatment, and the "best" treatment must be prescribed. If the clinician is uncertain, a treatment must surely be prescribed which is not known to be inferior. There are, of course, instances in which tests are not ordered and drugs are not prescribed, because patients cannot pay for them. Nevertheless, for a variety of reasons, some of which may have to do with mythic or magical elements in the relationship between physician and patient, the assumption that the doctor will do "the right thing" for the patient is widespread. The belief that no physician would explicitly prescribe less than excellent therapy for the patient is part of the ideology of medicine.

Dentistry, on the other hand, has institutionalized the phenomenon of the "multiple prescription."* Patients are routinely offered choices between silver amalgams and gold inlays in tooth restoration, between removable partial dentures and fixed bridges, and between plastic and porcelain crowns, among other choices. Dentists will often present a number of treatment plans to patients, all with varying price tags and all different in quality, but presumably all satisfactory. Perhaps the

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**The discussion which follows applies most cogently to the general practice of dentistry which is followed by approximately 90% of dentists.*

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multiple prescription is so common because dentists have only two other options, both of which are also problematic: they can prescribe the "best" course of treatment and thereby deny services to those who cannot afford them, or they can make judgments about patients' abilities and willingness to pay, and prescribe what they feel is most "appropriate." Issues raised by these options include: 1) fully informed consent (does the presentation of a number of options, more or less tailored on economic grounds by the professional, support informed layman choice?), and 2) patients' "right" to health care and adequacy of care (is doing something always better than doing nothing? if not always, then what are the parameters of adequacy in dental care?)

The multiple prescription may be conceived of as a recognition of dental "facts of life," viz., that individuals do have varying degrees of ability and willingness to pay and, collectively, that society cannot afford everything for everyone. About patients' willingness to pay for the best dentistry, we can say little. Patients' choices in this area are presumably consistent with their own personal value systems. Patients may not believe in the efficacy of dental care and in its ability to improve their lives, or they may simply prefer to purchase other goods and services instead. With respect to cost as a barrier to the purchase of the best dental care, economic imperatives and structural arrangements inherent in dentistry inevitably drive costs up.

Most dentists still practice as solo private practitioners. They are responsible, as individuals, for all of the costs involved in producing and delivering services to patients. Unlike physicians, who utilize the facilities and personnel of hospitals at no cost to themselves, dentists have to build, equip, and staff their own operating rooms. Dental insurance, which has increased dramatically in the past decade, still does not cover the majority of workers and their families. Because of a substantial backlog of unmet dental needs which an average American is likely to have, dental insurance is difficult to write. Typical dental insurance policies have substantial built-in co-insurance factors, some of which operate effectively to deny expensive varieties of dentistry to insured persons. Furthermore, although there is convincing evidence that some of the tasks performed by dentists can be managed adequately and more economically by people with lesser training, attempts to change Dental Practice Acts so that dentistry can become increasingly rationalized have met with a great deal of resistance within the profession. Recent FTC rulings which permit advertising are also being contested. Although advertising has brought with it innovative methods of delivering care (e.g., large

groups practicing in department stores), the effects of increased advertising on fees, quantity, and quality of service are empirical questions which have, as yet, been unanswered.

For the foreseeable future, dental care will continue to be a labor intensive service provided, for the most part, by highly trained individuals with expensive educations, working in isolation without proper staff, in expensive facilities* for whose upkeep they are personally responsible.** Under these constraints, the multiple prescription mechanism becomes more understandable, if not more defensible. Services which require more time and more expense in materials and additional labor (laboratory services are, in effect, subcontracted out by dentists), inevitably cost more and can be purchased by relatively few people.*** We should note that millions of Americans can afford no dentistry at all.

Dentistry combines structural, economic, and value norms into a system which has produced the multiple prescription and which effects a peculiar variation of moral dilemma involving both patients and practitioners. Where the issue is particularly well-defined and where there is consensus within the profession about what is in the patient's best interest (as, for example, in the case of root canal therapy vs. extraction), the dilemma is likely to be especially distressing. In addition to representing a threat to a core value or ideal of doctoring, the multiple prescription also may produce status pain because it suggests an image of dentists as vendors of a variety of goods of different quality, an image about which dentists are particularly sensitive. When patients are given a choice of treatments, especially when the results of these treatments have some of the attributes of products, dentists are apt to perceive role conflicts such as that between doctoring and salesmanship.

Although multiple prescriptions are not completely unknown in medicine, differentially priced therapeutic interventions for identical conditions, high cost "product-services," and the relative absence of

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The cost of building and equipping a modern four-chair office is rapidly approaching $100,000.

**Approximately 50% of general dental practitioners' gross income goes for expenses.*

***We are not suggesting that dental fees are calculated in a totally rational way. Removable partial dentures, for instance, which do not require extensive investment of dentist time, outside costs, etc., have been traditionally expensive relative to preventive or restorative services, perhaps because they are large, tangible "product-services."*

critical (life and death) health problems in dentistry combine to involve dental practitioners in a unique species of moral dilemma. Extensive discussions of the problematic nature of multiple prescriptions have not, as far as we know, appeared in print, but the phenomenon seems foreordained to persist in a free market economy. Some dentists will undoubtedly continue to suffer the status pains and role conflicts that arise from clashes between core professional values and the realities of practice. Some patients will undoubtedly continue to accept, as a result of the multiple prescription dynamic, less than the optimal treatment. The extent and severity of these stresses might be mitigated somewhat by universal patient access to care and by more explicit criteria for adequacy and quality of dental services.

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A man who is not a Liberal at sixteen has no heart; a man who is not a Conservative at sixty has no head.

—Benjamin Disraeli

The Mystery of Life

MARTIN A. ROTHMAN, D.D.S.

Should the dental practitioner be interested in the mystery of life? Yes! The dentist is a sophisticated intellectual whose curiosity encompasses basic and refined science, technical skills, art, philosophy, psychology, psychiatry and pathology. All these aspects of intelligence are involved in the daily routine practice of dentistry one way or another despite the ever present lacing of socioeconomics and its overt influences. He at some time in his waking day must ponder the mystery of life and the sheer wonder of how the living organism got to be.

According to Aristotle, nature makes so gradual a transition from the animate to the inanimate that the boundary between the two is doubtful and perhaps non-existent. As we learn more and more about the detailed mechanisms by which living organisms store and use energy, it is at times intriguing to speculate as to how they got started in the first place.

IN RETROSPECT

The first serious thoughts about this in modern times we owe to Darwin and Wallace[1] who speculated that if one keeps going back into the evolutionary past, eventually we must reach a point which some aggregates of matter looked at from a distance we would call alive and some of which we would not. Extrapolation further back would bring us to more primitive aggregates, none of which we would call alive. In other words, Darwin conceived of a living organism developing in an evolutionary sequence of events in time from non-living material which at some point when for some reason a sufficient number of the desired properties had come together in a single region of space we would call alive.

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Almost at the same time Louis Pasteur did an experiment in which he showed that under the present conditions of existence, no life can originate on the surface of the earth except as it came from pre-existing life. Although it is clear enough that Darwin's and Pasteur's ideas are not antithetical, nevertheless they are considered so by many until the turn of this century. As is true in most biological antitheses new knowledge leads to a dialectical resolution, sometimes by redefinition, sometimes by new experimental observations. Today a totally new concept has arisen out of the controversy between the vitalists and the mechanists, those that espouse spontaneous generations of life and those who maintain that life must come from pre-existing life.

THE LIVING AND NON-LIVING

It is easy enough if we attempt to describe the difference between man and an inanimate object like a stone, or between a bacterium and a large protein molecule to clearly define the properties that distinguish the living from the non-living. The living has the ability to change and mutate, and it has ability to metabolize food, and respond to external stimuli. If we add to this, size of the aggregate of a living thing, then organisms with the above properties would range from whales to bacteria of 200 Mu in diameter. A break would be present between the largest molecule a chemist knew which was 20 Mu and bacteria.

ENTER THE VIRUS

If viruses had not been discovered everything would have been well. Those who would like to believe that life was something distinctly set apart, unapproachable and unexplainable by science, would have felt comfortable. Then came the discovery of viruses around 1900.[2] First the plant virus of tobacco mosaic, foot and mouth disease virus of cattle, and then the virus of yellow fever affecting man. These infectious disease producing agents are of very small size, have the ability to mutate during reproduction. The fact that the virus needed a highly specialized cell in which to grow was no different in principle than that of any organism that required a certain environment in which to grow, even bacteria and animals.

Then came the startling revelations about the size of viruses from the crystallization techniques and the electron microscope in which all sizes of viruses were discovered, ranging from 20 Mu to 200 Mu. Some large viruses are actually larger than well accepted living organisms, and some smaller than certain protein molecules. Therefore at last a

continuity was found to exist as we go from electrons, mesons, atoms, and molecules of the physicist and chemist to the organisms of the biologist and so on to the stars and galaxies. Nowhere is it possible any more to draw a line saying below this line size is non-living and above it is living. There exists a gradual transition with respect to size and complexity from things that are normally considered alive to things generally considered non-living.

REPRODUCTION

It has been stated above that the essence of life is the ability to reproduce, a specific predetermined pattern which is retained and perpetuated in time. But in the course of this process another basic property appears, that is, the ability to mutate, to change or to respond to a stimulus. "It is this which adds grandeur to life and is responsible for the whole of the evolutionary process and the myriad kinds of life on this planet. It is responsible for man, his conscience, his faith."[2] We have known since Darwin's time about formation of new species, have seen them produced experimentally by a variety of techniques. If viruses are living organisms, they also should exhibit the property of mutation. That they do is now well established and this fact has become the basis for oral vaccines against poliomyelitis and measles.

What we have learned about viruses has come from being able to recognize, purify and isolate them in pure form. As a result there is now thought to be no fundamental distinction between animal and plant viruses. In fact the bacterial virus is a very complex structure with a head and a tail like the sperm organism of higher animals. Some like vaccina are more differentiated and approach the nature of an organism because it exhibits a cell-like structure. Some, besides nucleic acid and protein appear to have lipid and carbohydrate in a limiting membrane. So we have a wide range in virus structure from small crystallizable animal, plant and human viruses, which are nucleoprotein molecules through intermediate structures consisting of nucleoprotein lipid and carbohydrate to large structures possessing a morphology and composition in all respects similar to that of an accepted cellular organism. They have all the important property to reproduce their own characteristic structure when placed within living cells.

How did chemical structures like nucleic acid which possessed the ability to replicate come into being? Melvin Calvin[3] suggests ways in which random organic synthesis and autocatolysis could lead to an organized structure in which all the elements are related to one another in a rather specific way. He believes the catalytic

developments or proteins and the code development of the polyneucleotides arose and grew simultaneously.

THE BEGINNING OF LIFE

Eventually there must have come the key step, the formation through chance combination of a nucleic acid molecule which had the capacity of replication. That moment marked the beginning of life. The deoxynucleic acid molecule DNA became a code which contained all the information required to replicate itself and also control the protein structures by dictating the specificity of protein synthesis. If we agree that DNA is an encoded form of life capable of self replication and that it can bring about the translation of its own code into the remaining aspects of life, then it would follow that given reasonably healthy environment containing materials for synthesis, that DNA once created in the right place and time could indeed create life and perpetuate it.

ASSEMBLIES OF GENES (Chromosomes)

When a chemical structure something like DNA which possessed the ability to replicate came into being once upon a time—it would have gone on forever thus unless the great phenomenon of mutation was also present. In a sense this is a built-in error provided by nature so that replication is not perfect, and it so happens that one in about a million times the replication produces something that is slightly different.[2] Such a change, recognized as a mutation, is of very great importance and as these errors or differences accumulated from the first produced nucleic acid, many nucleic acid compounds came into being, now recognized as genes.

As an assembly of genes now called chromosomes came about, a physical structure appeared which was responsible for the accumulation and preservation and exhibition of these differences. Such assemblies of genes were incorporated finally into a structure with a limiting membrane, and once this great step in evolution took place, it became possible for gene interchanges between the cells. The greatest form of genetic interchange is of course the sexual process in which there is a fusion of two cells. This is a phenomenon of greatest fundamental importance, for now the way is open to genetic combinations, a factor of the greatest speed-up of the evolutionary process. And so we find 1. the power to replicate in nucleic acid compounds; 2. mutation because of a built in error in the replication process: and finally 3. genetic recombinations as recognized factors upon which life as we know it is dependent.

DISCUSSION

Having said all this, is it possible to reduce biology to physics and chemistry? Is it enough to rely upon the chemistry of the DNA to explain all living activity? Hinshelwood[5] points out clearly that it is a dangerous oversimplification to hold the view that DNA is the basis of genes which could ever be self-replicating in isolation. "The building blocks of cells, wonderful as they may be as structures, are useless by themselves", that no special part need be credited with a new and mysterious virtue by which to duplicate itself, that nothing less complex than an entire cell is capable of self-replication. We are still not in possession of the missing link between the highest organized virus and the living cell. What is becoming clearer all the time as Elsasser[6] points out is that an organizing specificity cannot be due the DNA of the germ cell alone, and for that matter no single component of the germ cell can possibly serve by itself as the final arbiter of biological specificity. Nils Bohr[7] has stated this point clearly. "Life cannot be reduced to the chemistry of some special substance, and that the very existence of life must in biology be considered an elementary fact, just as in atomic physics the existence of a quantum of action has to be taken as a basic fact that cannot be derived from ordinary mechanical physics."

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News of Fellows
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cited as a "learned scientist and clinician, gifted teacher and skilled administrator (who) has distinguished himself throughout his life."

Alex J. McKechnie, Jr., of Camp Hill, Pennsylvania, was installed as the Academy of General Dentistry's new president during the closing session of the 1979 House of Delegates, in June, at the Annual Meeting in New Orleans.

Manuel I. Weisman of Augusta, Ga., was elected President of the Medical College of Georgia Chapter of Sigma Xi, The Research Society of North America. He was also appointed a trustee of the Endowment and Memorial Foundation of the American Association of Endodontists.

Edward B. Armstrong, an Oral and Maxillofacial Surgeon of New York City has been elected President of the New York Academy of Dentistry.

Frank M. Lapeyrolerie, oral surgeon, has been named acting dean of the New Jersey Dental School of the College of Medicine and Dentistry of New Jersey.

Brigadier General **Joe L. Cheatham**, deputy commander for dental services for the U.S. Army Health Services Command was honored with the Distinguished Alumni Citation from Henderson State University, Arkansas at its 89th annual commencement exercise.

Joseph P. Cappuccio, ADA president, was awarded a special citation in recognition of his outstanding leadership at the commencement exercises of Fairleigh Dickinson University, Hackensack, New Jersey.

John M. Faust, Hattiesburg Mississippi orthodontist was recently installed as president of the American Association of Orthodontists.

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