

GRADUATES OF DEGREE PROGRAMS IN PROSTHETICS AND ORTHOTICS^a

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INTRODUCTION

The first graduates of a prosthetics and orthotics degree program in the United States were two students who received their baccalaureate degrees from New York University in 1965. Four years later, in 1969, a total of 25 NYU students had been awarded the bachelor of science degree in *prosthetics and orthotics*.

The first students to be graduated from a 2-year degree program in *prosthetics and orthotics* received the associate in arts degree from Cerritos College in 1967. In 1969 a total of 29 students had been graduated from that program. At the same time, a total of 30 students had received an associate in arts degree in *prosthetics* after completion of a 2-year program at Chicago City College and Northwestern University. The first degrees from this program were awarded in 1968.

By the end of the 1969 school year, then, 84 students had been graduated from a degree program: 25 with a bachelor of science degree in *prosthetics and orthotics*, 29 with an associate in arts degree in *pros-*

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thetics and orthotics, and 30 with an associate in arts degree in *prosthetics*.

In January 1970, these 84 graduates were requested to participate in a survey proposed by the Subcommittee on Educational Projects in Prosthetics and Orthotics, Committee on Prosthetic-Orthotic Education (CPOE).^b The members of the Subcommittee felt that a survey of graduates would not only supplement the data yielded by the Manpower Survey (1) (also sponsored by this Subcommittee), but would provide information related to the professional and economic status of members of this unique group—the first to practice their profession following graduation from a degree program. It was also thought that the insight these graduates acquired in terms of their education and profession could be profitably shared by others.

RESULTS

The response to the survey was good, with 84.5 percent of the 77 students returning the completed survey form (Table 1). (Seven forms were not delivered because of inadequate addresses.) Of the 65 respondents, two had been graduated in 1965, one in 1966, 13 in 1967, 23 in 1968, and 26 in 1969 (Table 2).

TABLE 1.—*Survey Distribution and Returns*

School	No. of forms delivered	No. returned	% returned
New York University	23	20	86.9
Cerritos College	27	20	74.0
Chicago City College	27	25	92.9
Total	77	65	84.4

TABLE 2.—*Number of Respondents by Year of Graduation*

Year of graduation	Number of respondents
1965	2
1966	1
1967	13
1968	23
1969	26

^b The Committee on Prosthetic-Orthotic Education is supported by the Prosthetic and Sensory Aids Service, Veterans Administration, and the Rehabilitation Services Administration, Social and Rehabilitation Service, Department of Health, Education, and Welfare.

Fifty-two respondents in civilian status were gainfully employed in the fields of prosthetics and/or orthotics at the time of the survey and were located geographically as follows: 10 in California; nine in Illinois; six in New York; four in Pennsylvania; three each in Florida and Michigan; two each in Maryland, Texas, North Carolina, Ohio, Vermont, and New Jersey; and one each in Montana, Louisiana, Indiana, the District of Columbia, and Vancouver, British Columbia. Two were in the military service, one of whom was working in prosthetics. Eight were continuing their education at an advanced level in the fields of prosthetics and orthotics; two were unemployed at the time of the survey; and one was working as a custodian with plans for entering physical therapy (Table 3).

TABLE 3.—*Status of Respondents at Time of Survey*

Status	No. of respondents
Employed in prosthetics and orthotics	52
Continuing education	8
Military service *	2
Unemployed	2
Employed outside of field	1

* One working in the field of prosthetics

Place of Employment (Table 4)

Of the 53 graduates working in the fields of prosthetics and/or orthotics, 42 were working in a commercial facility, seven in a hospital, two in a university research program, one in a medical school, and one in the military service.

TABLE 4.—*Place of Employment of 53 Graduates Working in Fields of Orthotics and Prosthetics*

Place of employment	No. employed
Commercial facility	42
Hospital	7
University research	2
Military	1
Medical school	1

The average period of employment for most graduates at the time of the survey was 2 years or less (Table 5). Because none had been graduated for more than 5 years, it is obvious that a few left employment temporarily to attend school, or, at least part of the time, attended school during the period of employment.

TABLE 5.—*Years at Present Place of Employment*

No. of years	No. of respondents
1 year or less	21
2 years	17
3 years	6
4 years	3
5 years	1
10 or more years	4

TABLE 6.—*Number of Employees^a in Place of Employment*

Range	1-25 employees
Average	7.5 employees
Mode	4.0 employees

^a Prosthetists, orthotists, and technicians.

Graduates were working in situations where the total number of employees (prosthetists, prosthetic technicians, orthotists, and/or orthotic technicians) ranged from one (the respondent) to 25, with an average of 7.5 per place of employment (Table 6). The mode was 4.0 with nine respondents reporting that number of employees in their facilities. Of the total employees at the 58 places reported (five of the respondents who had left employment temporarily completed this item on former place of employment), the ratio of prosthetists to prosthetic technicians was 1.3 to 1; orthotists to orthotic technicians was 1.1 to 1. This corroborates the findings of the Manpower Study. A 1 to 3 ratio was reflected in three of the largest organizations.

In selecting the place of employment, the graduates listed one or more reasons for their choice, with "work opportunity" appearing most often (Table 7). Several checked all categories. Although "geographic desirability" was checked only 22 times, it was found that 40 graduates (74 percent) were working in the same general geographic area in which they lived before attending school.

TABLE 7.—*Reasons for Selecting Current Place of Employment*

Reason	No. of respondents
Work opportunity	40
Salary	16
Geographic desirability	22
Family business	10
Educational & professional opportunity	11
Other	5

Most graduates had been working in the same job since graduation. Twenty-one, however, had been employed elsewhere. All except one of the eight NYU graduates who left previous employment did so either because the job lacked an opportunity for professional growth and development or because they were offered a better chance for advancement elsewhere. Salary as a consideration was cited in two instances.

Four of the 15 A.A. graduates who left previous employment did so to return to school. Other reasons cited by individuals varied as follows: the working situation allowed no opportunity for applying modern techniques; could not maintain two jobs; drafted; the responsibilities of the job were much greater than his talents; wanted to get away from home; offered the kind of job he wanted in research; and other reasons related to salary and personal considerations. Obviously, in this group, no well-defined pattern emerged as a cause for resigning.

Salaries

As might be expected, the salaries of the graduates of the baccalaureate degree program, all of whom were located on the east coast, were considerably higher than those of the associate in arts degree program (Table 8).

TABLE 8.—*Salary Range by Educational Level of Graduates*

Salary ranges	B.S. degree	A.A. degree
\$ 5,000- 5,999		1
\$ 6,000- 7,999		20
\$ 8,000- 9,999	4	10
\$10,000-11,999	6	3
\$12,000-14,999	5	
More than \$15,000	4	
Not applicable (Student or unemployed)		9 10
No response	1	1

The average number of years experience for this group was too few to show any influence on salary level. All those in the highest income brackets, i.e., over \$15,000, were in executive or administrative positions, such as president, vice president, or manager of an organization or department.

Twenty-one (62 percent) of the 34 salaries reported for this group were less than \$8,000, and 10 (29 percent) were in the range of \$8,000-10,000. No salaries under \$8,000 were reported for NYU graduates; no salaries over \$12,000 were reported for A.A. graduates.

The median salary for those holding the baccalaureate degree is higher than that reported for prosthetists and orthotists in the Manpower

Study: \$12,000 versus \$9,500. However, the median salary for holders of the A.A. degree is slightly lower: \$9,000 versus \$9,500. The experience factor may be of considerable influence here inasmuch as most graduates had only 1 or 2 years in the field.

Number of Hours in Normal Work Week (Table 9)

Along with impressive titles and higher salaries go increased number of hours worked. Generally, persons in executive or administrative positions work at least 50 hours a week and some considerably in excess of that number. Most graduates with baccalaureate degrees work more hours than those with A.A. degrees. Fifty-two percent of the former work 50 hours or more each week compared with 14 percent in the latter group.

TABLE 9.—Number of Hours in Normal Work Week

Hours	B.S. degree		A.A. degree	
	No.	Pct.	No.	Pct.
Less than 50	9	47.4	29	85.3
50-60	8	42.1	5	14.7
More than 50	2	10.5		
Total respondents	19		34	

TABLE 10.—Vacation

Salary range	1 week	2 weeks	3 or more weeks	Total
Less than \$6,000	1	1		2
\$ 6,000- 7,999	5	9	2	16
\$ 8,000- 9,999	3	8	2	13
\$10,000-11,999		5	2	7
\$12,000-14,999		3	2	5
More than \$15,000		2	1	3
Total	9	28	9	46

Vacation (Table 10)

In completing the question on vacation, 46 persons stated vacation time allocated. Nine of the 46 (19.5 percent) received 1 week's vacation, five (55 percent) of whom were receiving salaries in the \$6,000-7,999 range. Twenty-eight (61 percent) received 2 weeks' vacation. Nine (19 percent) received three or more weeks' vacation. For three employees, vacation time had not been determined or was varied. Four persons failed to complete the question. No relation between number of days vacation and experience nor educational level was detected.

Hospitalization and Sick Leave (Table 11)

Forty-three respondents reported that hospitalization was included in fringe benefits. In only six instances was it not included.

Sick leave of varying number of days was included in fringe benefits for 25 of the 43 who completed the item. Ten stated that sick leave was awarded as required, 12 reported that no sick leave was included, and in six instances the sick leave benefits were not specified. Of the 15 who were given a specific number of days, the range was 3–24 days with an average of 10 days.

TABLE 11.—*Hospitalization and Sick Leave*

<i>Hospitalization</i>		
Response	No. of respondents	Pct. of respondents
Yes	43	87.7
No	6	12.3
<i>Sick Leave</i>		
Response	No. of respondents	Pct. of respondents
Yes	25	58.1
No	12	27.9
Not specified	6	14.0

TABLE 12.—*Distribution of Work Between Prosthetics and Orthotics*

Type of work	No. of respondents
Prosthetics exclusively	22
Orthotics exclusively	6
Prosthetics and Orthotics	23
Prosthetics, including prosthetics & orthotics	45
Orthotics, including prosthetics & orthotics	29

Distribution of Work Between Prosthetics and Orthotics (Table 12)

Of 51 reporting respondents who were working in the field, 22 work in prosthetics exclusively; six in orthotics exclusively; 23 work in both fields. The number working in prosthetics, including those working in prosthetics and orthotics, totalled 45; those working in orthotics, including those working in prosthetics and orthotics, numbered 29.

Fifteen of the NYU graduates who reported were working in prosthetics and orthotics, but the bulk of the work was being done in prosthetics (68 percent of the time in prosthetics, 32 percent in orthotics). Only one of the 15 spent more time in orthotics than in prosthetics (70 percent in orthotics—30 percent in prosthetics). Two NYU graduates worked only in prosthetics; two worked only in orthotics.

Five Cerritos graduates worked in both prosthetics and orthotics (53

percent in prosthetics—47 percent in orthotics). Six worked exclusively in prosthetics; four exclusively in orthotics.

No Chicago graduates were working in orthotics exclusively. Fourteen were working in prosthetics exclusively, and four were working in prosthetics and orthotics (75 percent in prosthetics—25 percent in orthotics).

Job Responsibilities (Table 13)

New York University graduates reported spending a greater proportion of their time (32.3 percent) in fitting patients than in any one other work activity. An average of 20 percent of their time was spent in fabricating devices. Administrative duties occupied 13.2 percent of their work time, a higher percentage than that of the A.A. graduates whose administrative duties occupied about 4 percent. NYU graduates spent about a third of their time in such activities as consulting, attending clinic, instructing, and supervising.

TABLE 13.—*Distribution of Time Spent in Work Activities*

Work activity (Prosthetics and orthotics)	New York University Time %	Graduates Cerritos College Time %	Chicago City College Time %
Fabrication	20	57.4	35.3
Fitting	32.3	18.5	38.8
Administration	13.2	3.8	4.3
Consultation	6.8	5.7	8.2
Attending clinic	9.7	7.3	6.1
Instruction	6.8	3.4	2.2
Supervision	8.6	.1	2.1
Other	2.6	3.8	3.0

About two-thirds of the work hours of A.A. graduates were spent in fabrication and fitting compared to about 50 percent for B.S. graduates. Graduates of Cerritos City College, where the curriculum includes both prosthetics and orthotics, were fabricating prosthetics and orthotics devices over half of their work hours, whereas the graduates of Chicago City College, where the program is exclusively prosthetics, were spending only about one-third of their work time in fabricating mostly prosthetic devices. Chicago City College graduates spent twice as much time in fitting patients as did Cerritos graduates.

Professional Relationships

In response to questions related to participation of the prosthetist as a professional member of a clinic team, the following information was submitted:

New York University graduates

Of the 19 employed NYU graduates, 15 did attend clinics and partici-

pated as professional members of a team. The four who did not attend had responsibilities that did not warrant attendance, or the clinic concept was poor in that area. One who did attend the clinics, however, noted that prosthetists were given only a surface acceptance by professional members of the allied health professions.

Only two noted any difficulty in communication with physicians and other professional people, one attributing this to physicians being extremely busy and one observing that, in isolated instances, individuals in other fields were not receptive to his point of view.

Cerritos College graduates

Of the 15 Cerritos graduates who were employed in prosthetics and/or orthotics, eight did not attend clinics. Usually, the firm was represented by a more senior or experienced member. Two noted a lack of amputee clinics in the area. One respondent stated that the orthotist is respected for his opinion regarding aspects of proper bracing. Since a number indicated that this is not always true, it is interesting to note that this man had exposure to hospital rounds, followed by question and answer periods, during his clinical training. None of the 15 recognized any difficulty in communication, although one noted much improvement was needed and desired.

Chicago City College graduates

Many of the 20 Chicago graduates did not attend clinics, and in most cases attributed this to the need for more experience as required by the supervisor before attending. Two felt strongly that they should attend, and one gave his inability to attend as one reason for leaving the place of employment. Three Chicago A.A. graduates expressed some difficulty in communicating, and two stated a lack of understanding of clinical pathology and a need for some background in medical subjects. One felt ill-at-ease because of the few clinics he had attended, and one implied that, although he had no difficulty in communicating, physical therapists had difficulty in understanding him.

Educational Program

A question in the survey, "In general, did you find that your prosthetic and/or orthotic educational program prepared you adequately for your current responsibilities?" showed 43 graduates answering in the affirmative, 12 in the negative, and five were apparently undecided. For those who felt that they were not adequately prepared, eight expressed an urgent need for more practical experiences; seven a need for more direct contact with patients and their problems in order to view the patient as part of a rehabilitation program; five wanted more courses in management or business administration; and six felt more advanced courses in prosthetics and orthotics were needed.

The school courses that were listed as most valuable in terms of post-graduate professional activities were: prosthetics and orthotics, considered so by 26 respondents; and anatomy, rated second by 17. All courses were found valuable by nine respondents, and biomechanics was listed most valuable by two.

Eleven respondents found the courses in liberal arts the least valuable; nine listed professional problems as least valuable; eight, biomechanics; five, drafting and sculpture; two, clinical application; and seven A.A. graduates declared that the first year in the program was wasted.

In responding to the question, "How do your present duties correspond with your expectations?" the NYU graduates, for the most part, said that their present duties did correspond with their expectations. However, there were minor exceptions, such as one expected more clinical work, one more research; one expected to be more clinically than administratively involved; one said the work was more demanding than he expected. One expressed acute disappointment in his relationship with members of the team and felt that the prosthetist was not given the recognition he should have in terms of his own professional knowledge. He pointed out that physical and occupational therapists, having attended a 1- or 2-week course, were recognized as authorities in the field of prosthetics and orthotics, more so than he who had received a B.S. degree in this field.

More of the Cerritos and Chicago graduates failed to complete this question than did the NYU graduates, perhaps because they may not have formed definite conclusions about their work. The responses from the graduates of the two schools were approximately the same. Most said their present duties were what they had anticipated; however, a few from both schools said that the present situation was far beyond their expectations, stating that they had much more responsibility than they had expected. Several were disappointed at the level of salaries. One said his duties were "below par," indicating his superiors were reluctant to allow him to improve on methods.

Sixty-one of the 65 respondents (94 percent) plan to stay in the fields of prosthetics and/or orthotics. Three are undecided—two citing unsatisfactory salaries as a consideration and one unable to find employment in a foreign country where she now lives.

Professional Goals

Professional goals were quite different as expressed by graduates of the three different schools. The goals of NYU graduates appeared to stem from a motivation directly or indirectly related to professional advancement of their field. Some looked forward to teaching, research, or providing services at a high professional level. Others stated that their goal was to raise the level of prosthetics and orthotics at local and na-

tional levels, to raise professional standards, or, ultimately, to reach the same professional level as doctors or dentists.

Fifteen of the 21 respondents from Chicago stated that their professional goal was to own a facility. Two spoke of advancing their own professional and educational status; one wanted to become knowledgeable in orthopedics. The graduates of Cerritos College were more interested in certification, and eight expressed this as their short-term goal. Two graduates were interested in the field of education as a long-term goal; two wanted to obtain a higher degree; six wanted to eventually own their own facility; three expressed an interest in education and research; and two were interested in advancement related to their professions.

DISCUSSION

In 1969 we were well-pleased with a 49 percent response to the Manpower Survey, inasmuch as responses to previous surveys in the fields of prosthetics and orthotics were far below that level. It is now most encouraging to receive a response of 84.5 percent to the present survey. Furthermore, the care and thoroughness with which the forms were completed are manifestations of the respondents' interest and concern, both in the quality of prosthetic and orthotic education and in the professional status of the two specialties. The comments of several graduates reflected an attitude of urgency and deep concern in terms of development and advancement of their own field.

An earnest desire to function and to be recognized as a professional person was uppermost in the minds of many of the graduates. It seems that every emerging health profession is inevitably faced with the situation in which the need and the right to be accepted by other professional groups are initially denied. Although the professional, himself, knows that he is capable of contributing—in this instance, to the rehabilitation of orthopedically disabled patients—he may find that he is not consulted or that his suggestions are ignored or met with skepticism. These kinds of reactions by other professionals may often be expected and may be attributed to a lack of knowledge or understanding on their part, unfortunate past experiences, or simply a natural resistance to the new, or to change.

One would like to suggest a quick and easy way to overcome this difficulty, but most persons who represent an emerging health profession and who are well-established as a member of a professional team have acquired this status by a patient and persistent educational effort, an effort which at times may be discouraging. When a person can consistently and helpfully respond to needs that others cannot respond to, however, it is only a matter of time before the value of his contributions is recognized and he becomes accepted as a member of the team.

It is obvious from the comments by graduates that they are not willing to work in situations where they cannot be creative or innovative, or where new techniques and developments in prosthetics and orthotics are ignored or ruled out by reactionary supervisors. In general, graduates of prosthetics and orthotics degree programs reflect a visionary outlook and are demanding professionalism in their practice. Furthermore, graduates who have had two or more years of schooling in their specialty expect higher pay and will usually not stay at a place that does not offer a chance for economic security.

It is interesting to note that most of the graduates of the baccalaureate degree program did not consider professional goals in terms of their own personal goals, but of those goals related to advancement of their profession, whereas the A.A. graduates spoke in personally realistic terms and were more concerned with their own advancement. This can probably be attributed to the fact that most of the baccalaureate graduates seem to be placed in situations where they are finding job satisfaction and security and are looking beyond their own immediate needs. This attitude on the part of the practitioners themselves will probably do more to upgrade the professional status of prosthetists and orthotists than any external support or assistance will ever accomplish.

SUMMARY

Survey forms were mailed to 84 graduates of degree programs in prosthetics and orthotics. Seven forms were not delivered. Of the 77 graduates who received the forms, 65 completed and returned them, an 84.5 percent response.

Fifty-three of the 65 respondents were currently employed in the fields of prosthetics and orthotics. The data related to their work and professional status are analyzed and recorded.

Comments related to the educational program and future professional goals are summarized and reported.

REFERENCE

1. Perry, J. W. and B. R. Friz: Manpower Survey, Orthotics and Prosthetics, 23(4): 207-225, Dec. 1969.