Some years ago, the Veterans Administration in the U.S.A. inaugurated a system of prosthetic clinics in 30 of its outpatient facilities throughout the country in order to cope with the problem of providing satisfactory prosthetic care to its large number of amputee beneficiaries. Although this was not the first time that the “prosthetic-orthotic clinic” concept had been heard, it was the first intensive organized program directed towards providing integrated care to the amputee and brace wearer. Following the establishment of these first clinics, a government-supported research and educational venture gave further impetus to the growth of the clinic concept by offering fiscal, technical, and professional encouragement to selected communities to establish prosthetic clinics where none existed and to strengthen those already in existence.

The basic purpose of these clinics was twofold: to provide comprehensive prosthetic and orthotic services for the civilian and veteran population and to develop resources for research data concerning the use of various types of prosthetic-orthotic devices and techniques. Today there are well over 300 functioning clinics in the United States providing care to the amputee and brace wearer.

The prosthetic-orthotic clinic is essentially a means of coordinating the activities of interrelated medical and ancillary personnel. It is a method of organizing the communications and decisions of the physician or surgeon, serving as “clinic chief;” the physical and/or occupational therapist; and the prosthetist-orthotist. The contributions of additional medical and nonmedical specialists such as internists, pediatricians, rehabilitation counselors, and social workers are often required.

A pattern of clinic operation has evolved which essentially includes the following steps:
1. Patient Evaluation (Examination)
2. Prescription
3. Prefitting Therapy
4. Prosthetic-Orthotic Fabrication
5. Initial Evaluation (Checkout)
6. Prosthetic-Orthotic Training
7. Final Evaluation (Checkout)
8. Follow-up

It is clear then that as the clinic chief the doctor has several major responsibilities:
(a) Comprehensive evaluation of the patient, as well as the patient-appliance combination.
(b) Prescription of the prosthesis-orthosis and related training
(c) Provision of definitive medical and/or surgical services
(d) Coordination and integration of the other specialists

Competency to treat the amputee and brace wearer is clearly not required by all members of the medical profession. It is, rather, a highly specialized type of practice appropriate for a limited group and it is most desirable that these doctors come from specialty practices in orthopedic surgery or rehabilitation medicine so as to be well grounded in the structure and functions of the skeletal and neuromuscular systems. It is manifestly impossible to absorb meaningful specialized prosthetic-orthotic instruction within a reasonable period of time without this basic background.

As outlined previously, the responsibilities of the clinic and in particular its chief are both diagnostic and therapeutic in nature. In order to develop the pertinent “diagnostic” skills, knowledge in the following subjects is required:
(a) The functions of the normal upper-limb, lower-limb, and spinal systems understood in biomechanical terms.
(b) An appreciation of “theoretical” mechanics.

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covering forces, motion, levers, moments, center of gravity, etc., as well as the differential reactions of surface body tissues to pressure, shear, compression, etc.

(c) A review of the major etiological factors causing disruption of function,

(d) Pathomechanics -- an analysis of the functional consequences of the pathological condition, again in biomechanical terms.

With this four-part background the doctor is in a good position to define the nature of the patient's problems in terms that can be translated to prosthetic and orthotic care.

In order to fulfill the "therapeutic" responsibilities the doctor must, in the first instance, develop competency with regard to a substantial number of details of the prosthetic-orthotic process. The most important of these is an intimate knowledge of the numerous prosthetic-orthotic components, as well as fitting and alignment techniques. The advantages and disadvantages of the wide variety available must be known, so that differential prescriptions can be made for children, adults, and geriatric patients in relation to the specific level and nature of the disability presented.

Other factors which significantly affect prescription are sex, time since surgery, vocational and functional goals, as well as socioeconomic and demographic status.

Although it is not necessary for the doctor to master the detailed step-by-step skills exercised by the prosthetist-orthotist and therapist he must have an adequate understanding of their activities in order to properly prescribe these services. Lastly, when the clinic chief is a surgeon he, of course, must know the most modern techniques of amputation and reconstructive surgery.

The subject matter must also be considered in terms of the disparate problems of lower-limb prosthetics, lower-limb orthotics, upper-limb prosthetics, upper-limb orthotics, and spinal orthotics. Approximately one week of full-time instruction is required for lower-limb prosthetics and another week for lower-limb orthotics. Upper-limb prosthetics and orthotics can be covered adequately in another week, as can spinal orthotics consuming a total of approximately one month of full-time, intensive instruction. Of course this training time may be reduced if competency is desired only in prosthetics or orthotics. Lectures, discussions, and especially laboratory (clinical) experiences are required to provide a competent surgeon or rehabilitation specialist with the specific knowledge and skills to begin functioning as chief of a prosthetic-orthotic clinic. The importance of the liberal use of laboratory experiences within these courses cannot be over estimated. The mere presentation of theoretical and didactic materials, although important, does not provide the minimum skills required to proceed with patient care. Therefore, varied laboratory sessions with patients, emphasizing rigid dressings, gait analysis, functional activities, checkout, and prescription are required.

We find that the training of the physical or occupational therapists requires approximately six weeks of full-time, concentrated instruction--the additional time being spent in detailed instruction and laboratories, practicing stump conditioning as well as prosthetic and orthotic training procedures. The problem of educating the prosthetist-orthotist, however, is far more complex since historically these people have not had access to a basic professional training program. It might, therefore, be well to review the desired responsibilities and functions of the professional prosthetist-orthotist:

1. To serve as a member of the clinic along with the physician or surgeon.
2. To provide prosthetic-orthotic service to patients.
3. To be aware of, and contribute to, the progress and growth of the profession.

To fulfill these responsibilities adequately, it seems that there are six areas of skill and knowledge which are indispensable:

a. Physical sciences, including mathematics
b. Biological sciences
c. Psychological sciences
d. Mechanical skills and crafts
e. Communication skills
f. Personal and cultural qualifications

Several basic assumptions on which a sound educational program should be based, follow:

1. Graduates will practice their profession utilizing prefabricated prosthetic-orthotic components.
2. The fields of prosthetics and orthotics are one and not separate, distinct entities.
3. The academic level of the educational program and the value and acceptance of the degree or diploma must be comparable to that earned by other health professionals.

The student learns the practical clinical aspects of this field in four steps:

a. Basic shop training in metal wood, and plastic
b. Specialized training in the application of these techniques to prosthetics and orthotics.
c. Laboratory courses in the fitting and fabrication of appliances to a variety of patients.
d. Clinical internships at selected prosthetics and orthotics facilities

Instruction in steps a. to c. should be offered within the University where it is organized, supervised, and controlled by the faculty.

Although educational institutions fulfill the role of training and educating individuals, the ultimate prerequisite of certifying an individual's competency falls mainly to the profession itself. As such, the American
limb and brace group established the American Board for certification in Orthotics and Prosthetics in 1948. As might be expected the initial standards were considerably below any ideal or even acceptable level, requiring only some years of experience in the field to attain certification. Progress in the elevating of standards was at first slow and reticent but, in recent years, encouraging and significant.

Effective September of this year the minimal educational requirement for certification in prosthetics and orthotics mandates 2 years of postsecondary school (college level) training in addition to the short-term courses mentioned previously. As part of this 2-year training, introductory college-level courses in the following subjects are required: English and speech, biological sciences, physics and engineering, chemistry, mathematics, psychology, and shop training (at least one course in each subject area). The American Board for Certification has announced that the present educational requirements will terminate in 1980, at which time completion of an approved Bachelors degree program with a major in prosthetics and orthotics, plus one year of clinical experience, will be the minimum standard.

Thirty years ago, the entire world found itself very much in the same position regarding the lack of resources for prosthetic-orthotic education, as well as the lack of standards in the practice of these activities. As a result of the fortuitous economic and social situation that the U.S. found itself at the end of World War II, it was possible for us to move ahead in improving educational opportunities and standards. Although it would be presumptuous to suggest that the pattern which has been discussed is universally applicable, it would not be amiss to hope that a number of steps that have been taken are of substantial merit and are worthy of the consideration of our colleagues throughout the world facing similar problems and challenges.

I trust that you will find that these experiences have a pertinence to your own efforts along these lines. Thank you.