

# Orthotics and Prosthetics Today As Viewed by an Orthopedist\*

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It is a pleasure for me to be here this morning and have the opportunity of sharing with you some views regarding the current status of the profession of orthotics and prosthetics. In recent years, I have become rather closely associated with certain areas in your specialty, and hence am aware of at least some of the problems facing the field today.

With your indulgence, I would like to use this time to point out what to me seems to be the major problems confronting the prosthetic-orthotic profession today, and to offer some suggestions whereby these problems can be at least partially alleviated. It is a rare occasion for an orthopedist to give a talk and be unable to use slides for notes, so with apologies ahead of time, I will read to you some of my thoughts and ideas in this matter.

Problem number one is that there are too few of you to provide

adequate service to the ever increasing handicapped population. This results all too frequently in undue delay in fitting patients with artificial limbs or orthotic devices. It also tends to lower the quality of appliances provided, in that the demands of time alter the care and skill of fabrication. I think that there will be little disagreement that more manpower is needed in the field. The following possible solutions to this problem exist.

1. An intensive and organized effort to attract intelligent young men into the profession is needed. This should be an all-out effort conducted as a function of your national organization and extending into all areas of the country. Young men at every high school and junior college in the nation should be made aware of the fascinating potentials which exist in this profession, being as it is, a common merging ground for the sciences of medicine and engineering. A library of sound-slide talks and movies demonstrating current developments in new fabrication

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techniques, external power and myoelectric control should be established.

These audio-visual aids should then be available to local prosthetists and orthotists for use in high schools and colleges in their geographic areas. Other propaganda techniques at the local level could also be used, but there should exist a truly coordinated recruitment program directed from the national and regional levels.

2. The concept of prosthetic-orthotic technicians should be developed and encouraged. These individuals, given short-term basic training in fabrication techniques, would do much to lessen the load of the certified prosthetist and orthotist and improve overall delivery of services. This idea is already being employed in Vietnam and in other underdeveloped countries of the world, but has only a scant beginning in this country. The technician concept for the prosthetic-orthotic profession has its parallel in the current programs being developed at several institutions for training orthopedic technicians. You, no less than we, need an extra pair of hands to adequately serve the patient population.
3. In certain areas the concept of central fabrication may be worthwhile in an attempt to lighten the routine workload of practicing orthotists and

prosthetists. An inherent danger to this approach, however, is that the patient depersonalized, and individual requirements may not be satisfactorily met. Any attempt at central fabrication should be predicated on the fact that local alterations and modifications can be made in the component or appliance to meet individual situations.

The second major problem facing your profession today is that, as professional people, your time and energies are not being properly directed. This of course is partially a result of problem number one, and can be partially alleviated when more technical help is available to you. There should hopefully arrive a time when your activities and your energies can be redirected toward a higher and more productive level. You should be able to spend less time in manual labor, and more time in clinics with patients and doctors. You should be able to spend less time in the business and administration of your shops, and more time in local research. To accomplish these things you will need increased help in the form of technicians and business managers, and perhaps from central fabrication techniques. It is important that you be able to develop a closer working relationship with the medical profession, gaining mutual understanding of patient problems and musculoskeletal deficiencies. This can be accomplished by attending clinics, participating in resident conferences and Journal clubs, and promoting your own educational activities for residents and other physicians in



areas of prosthetics and orthotics. It is essential that the importance of continuing education be recognized, and that local Journal clubs and regional meetings be held periodically for the exchange of information and ideas in addition to your attendance at national meetings. In those areas close to a medical school or residency training program, lectures or courses in anatomy and musculoskeletal disorders can be organized with resident help and participation.

Finally, in restructuring your time schedule, an effort should be made to engage in some research activities, should it be no more than trying to solve a problem by trial and error, or by getting together with the physician to figure out a new approach to an orthotic or prosthetic problem. Remember, many of the most practical and most applicable new ideas come, not from large research centers, but from the local level.

A third major problem is what I like to call the "orthotic lag." This lag in development of the orthotic field is a real one, and poses a major problem at the present time. Orthotics has taken a back seat to prosthetics, and perhaps for good reason. The needs of the amputee are more immediate and obvious, and the wars of the past thirty years have yielded untold numbers of young men in their prime whose productivity depended upon satisfactory functional restoration of their missing limbs. Medicine, engineering, and the prosthetic profession have responded to the needs of the amputee through extensive research and development, wide-

spread educational programs, improved fabrication and fitting techniques, and better delivery of services. The field of orthotics remains in comparative disarray, with more limited though no less sophisticated research activities, few educational endeavors, and little improvement upon local fabrication and delivery services over the past fifty years.

There are no accurate statistics as to the number of persons in this country requiring orthotic services, but when one considers the sheer numbers of spinal cord injuries, stroke victims, congenital neuromuscular disorders, arthritic and post-traumatic neuromusculoskeletal disorders alone, it is obvious that there is a much greater need for progress in orthotics than in prosthetics. Why then, have there not been comparable advances in the orthotic field? I believe there are some definite reasons for this "orthotic lag." There is first of all the more obvious and immediate need for replacement of a missing limb as opposed to restoring function to a deranged limb which at least has not parted company with the remainder of the body. Secondly, a missing limb presents in many instances a more straightforward problem—that of replacing the entire missing part, duplicating mechanically as many normal functions as possible. One below-elbow amputee presents essentially the same problem in terms of functional replacement as any other below-elbow amputee. The same cannot be said for an impaired upper extremity. Specific missing functions must be substituted in the presence of



intact anatomy, and the variety of functional losses which one encounters means that design criteria must be correspondingly varied and adapted to each individual patient. I find it somewhat discouraging to realize at times that we can replace a missing extremity and secure a better functional result in some cases than we can get in a paralyzed limb with the orthotic options open to us today.

Perhaps the best indication of this lack of progress in orthotics is the fact that the American Academy of Orthopedic Surgery's Committee on Orthotics and Prosthetics is currently attempting to revise Volume I of the Orthopedic Appliance Atlas, which has gone unchanged since 1952, 17 years ago. Relatively little new in bracing will be added to the new Atlas. Rather, new approaches to orthotics are to be outlined, based on a systematic analysis of the patients' problem. In order to bring orthotics to a comparable point in development as prosthetics, we must first rid ourselves of the current mass confusion in terminology and meaningless approaches to prescription writing. We must then orient our thinking just as we did early in prosthetics research and development to basic biomechanical principles governing normal function of the extremities, and to the consequences of functional impairment upon the biomechanical system. An attempt is presently being made to devise a technical analysis form wherein one can diagrammatically plot the biomechanical losses present in an extremity. Once properly identified these losses can then be matched

against specific components or component systems to substitute for the functions lost. In this way, a more rational and scientific approach to bracing will be achieved. It will also serve to identify areas or functions for which satisfactory components are not presently available, and thus become the basis for future design. In addition, it is to be hoped that such a systematic approach to the problem of bracing will be a valuable teaching tool for physicians and orthotists alike, and serve as a common meeting ground upon which to work out specific problems in bracing.

The last major problem which I want to mention is the matter of inadequate delivery of new and improved devices to the patient population. This is particularly a problem in orthotics and in child prosthetics. There exist in this country and Canada several research centers which are engaged in highly sophisticated research activities with the aim of improving upon our current braces and limbs. While entirely laudable and productive of intricate and ingenious design, these centers, with rare exception, have not succeeded in providing improved appliances which in turn may reach the general population. There is an urgent need at present for 1) more practical research activity at a local level, and 2) a means of putting into mass production effective components and devices developed at the research centers so that they may reach the public.

In summary, I have presented to you what I consider to be the major

problems confronting the prosthetic-orthotic field today. There are doubtless many others which will emerge during the course of this seminar. The problem areas as I see them include inadequate number of personnel, improper direction of talent, a disproportionate relationship between orthotics and prosthetics, and failure of delivery of new and improved devices to the masses of handicapped people.

I have suggested some ideas for improvement of the current situation. The solutions to the problems rest heavily on your shoulders and will not come easily. Those of us in the fields of orthopedics and rehabilitation stand ready to assist you in every possible way in meeting the challenges of the next few years, and we look forward to an ever closer relationship between our professions.