

The Role of Prosthetics In Rehabilitation

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Dorland's medical dictionary states that prosthetics is "a branch of surgery pertaining to artificial organs or parts".

This is a most inadequate definition, which I propose to revise. The only inference one can draw from this antiquated interpretation of the word prosthetics is that it must be a prosaic, uninspired, rather insignificant, and practically moribund appendage to a decadent and forlorn branch of medicine. It conjurs up images of gnome-like figures laboring in cold, unlighted, airless cellars, conversing by monosyllables in monotonous, pursuing their grim tasks with neither purpose nor pleasure.

In actuality the bracemaker of the ancients was probably the castoff armorer, who, incapacitated for field service with his master, was forced to eke out his living as best he might, and who tried his hand at primitive brace and leg making to aid some of his crippled former brothers in arms, and his disease deformed fellow villagers.

Soon, however, a handful of ingenious individuals, more thoughtful and inventive than most, discovered by trial and error that certain definitive principles of construction and adaptation, or fitting, resulted in the fabrication of products more salubrious for their clients. They became aware also that much satisfaction could be derived from work well done, and work providing succor to the crippled. They learned that each patient presented an individual problem to whom general principles could be applied.

You, who are heirs to an ancient and honorable craft, are fully aware of the slow, sometimes faltering, progress toward the production of more suitable appliances for the

needy. You well know that traditions of good workmanship have been handed down from father to son in many shops. This may have been accompanied by the careful guarding of certain details of construction or fabrication in some instances. Such, however, was the custom in all the arts and crafts until very recently in man's history.

Within the past fifty years, surely within the memory of your fathers, the entire social structure of civilization has undergone profound changes. Scientific and technical advances in every field affect us all. The automobile, the telephone, electric lights, new and better foods, the discovery of metal alloys, plastics, penicillin, and deficit spending have rechanneled the daily activities of every citizen.

The additions to our knowledge in every field have given rise to the specialist within each field. Manufacture of many things has necessitated the formation of large organizations. Correlation of the results of

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The Academy of Orthopaedic Surgeons has picked Dr. Mazet as its Nominee for Director of the American Board for Certification. His name will be presented at the National Assembly in Chicago this month. A graduate in medicine of Columbia University, Dr. Mazet is Chief of the Orthopedic Service of the VA Center in Los Angeles. He was elected a Fellow of the American College of Surgeons in 1942.

investigation, production, and distribution requires teamwork. No longer is it possible for an individual to master all the knowledge and techniques in his chosen vocation, and teamwork demands the pooling of knowledge and effort. The self sufficient man is an anachronism.

Research is the key to future living. Even here the day of the single investigator, working moodily in gloomy solitude, has passed. Research is now conducted by teams of workers.

By these tokens one must realize that the artisan, who by his magic skill fabricates brace or prosthesis, cannot himself render a *complete service* to the crippled individual. Nor can he anticipate the acquisition of any particular bit of knowledge which will set him above his contemporaries to his selfish advantage. Firstly, he is in no position to undertake the necessary research; secondly, should he stumble on a worldshaking new technique, if he does not share it, he will be criticized by his jealous associates, who will immediately become his rivals and detractors.

Teamwork in Research

It has long been apparent that better, more functional prostheses were needed. No individual prosthetic manufacturer possessed the time, facilities, or finances to embark on an investigative program of the magnitude necessary to produce the desired improved devices. With the entrance of this country into World War II, the government became engaged in financing research by teams of investigators in many fields. The National Research Council formed an Advisory Committee on Artificial Limbs, which immediately initiated research in the prosthetic field. The medical departments of the Army and Navy lent their support to the research in prosthetic devices.

The Orthopedic Appliance and Limb Manufacturers Association endorsed, and cooperated with the work assigned to diverse laboratories, engineering firms, and manufacturers. Amputation centers were established by the Services for the treatment and rehabilitation of the amputee.

In these centers the necessity for teamwork was again demonstrated. The surgeon produced the best stump he could devise. The physiotherapist and corrective therapist undertook bodily conditioning of the patient. The prosthetist provided an artificial appendage. The amputee trainer instructed the amputee in its use. The psychiatrist guided the patient in the mental adjustment necessary for his acceptance of his handicap. The job counsellor directed efforts toward self support. The patient was the hub of the wheel of activity.

It is not necessary to review in detail here the progress in amputee rehabilitation which has taken place during the last ten years. Neither the surgeon, the physical reconditioner, the prosthetist, nor the employment representative can accomplish the task alone.

Cooperation of research groups, engineers, surgeons, limb manufacturers, psychologists and psychiatrists, under the program instituted by the Advisory Committee on Artificial Limbs and the Veterans Administration has given us a practical suction socket for above knee amputees. We are now becoming familiar with the fabrication and fitting of the various components of lighter, more comfortable, more functional, and longer lasting artificial arms. These have been developed by the combined efforts of a number of agencies, primarily the Northrop Aircraft Co., the Army Prosthetic Research Laboratory, and the Engineering Department of the University of California, Los Angeles.

Many other subjects pertaining to prosthetics are now under investigation. A few are the hydraulic knee joint, the automatic correlation of knee flexion with dorsiflexion of the foot, the application of the suction socket to below knee wearers, improved activating and control mechanism for both upper and lower extremity prostheses. The surgical techniques, and the application of our newer knowledge of upper extremity prosthetics are being reviewed to better evaluate the usefulness of cineplastic motor tunnels.

The dingy shop, tucked away in an undesirable basement, has moved upstairs into a clean, light, well equipped laboratory for the fabrication of improved mechanical aids for the crippled. The work of the craftsman is based on fundamental research in metallurgy and engineering. The results of this are incorporated in the mechanical devices at his command. The product of the research and workmanship of other

members of the prosthetic team provides him with better techniques, and materials, and a more suitable subject. They help in the training of the subject in the use of the artificial appendage which his artistry builds and in the patient's adjustment to the loss of an extremity. *The prosthetist is a member of a team.*

It is clear that prosthetics is the concern of an integrated group of artisans working toward a common goal, the rehabilitation of the amputee. No single member of this team can achieve this alone. Indeed prosthetics is the rehabilitation of the amputee.

In conclusion, I should like to propose that prosthetics be defined as the art of rehabilitation of an amputee; it being the summation of the efforts of the patient, surgeon, limb manufacturer, physiatrist, psychiatrist, amputee trainer, and employment counsellor to fully integrate the amputee into productive society.

"What's New(s)"

• FRED R. NORTON was married May 3 to Miss Marjorie Rose Waddle at Hope, Arkansas. Mr. Norton is a member of the National Advisory Council to the Certification Board, from District 28 (Oklahoma and North Texas). He is associated with his father in the operations of the Larkotex Company at Texarkana, Texas.

• CLINTON L. COMPERE, M.D., Vice President of the Certification Board, was a guest of honor at the meeting in Chicago May 28 of artificial limb and brace shops. Dr. Compere is Senior Consultant to the Veterans Administration in Chicago. With his brother, Dr. Edward L. Compere and Dr. Sam W. Banks, he is co-author of the "Pictorial Handbook of Fracture Treatment," 3rd edition, published at Chicago by Yearbook Publishers, Inc.

• HARTWELL BREMER, brother of Wilmore Bremer, is operating a brace shop at Mexico City. He was a recent visitor to the Bremer Brace Mfg. Co. at Jacksonville, Florida.

• GLENN E. JACKSON, Executive Director of OALMA has been named the American member of an *International Committee on Prostheses, Braces and Technical Aids*. The committee has been established by the International Society for the Welfare of Cripples. It will work for the development exchange of information about care of the handicapped in various countries. Dr. Sven Kaier, Chief Surgeon of the Orthopedic Hospital in Copenhagen, Denmark, is chairman. Other members are Karl Montan, of the Swedish Society for the Crippled, and Dr. J. Craft of the British Ministry of Pensions.