A BASIC THEME OF COOPERATION

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. . . *an editorial*

For the first time, an entire issue of the Bulletin is devoted to a single topic—a conference of project leaders of both intramural and contractual projects in the VA prosthetics research program. These leaders, their close associates, and invited guests met in Chicago, July 19-23, 1974, to review the broad VA prosthetics research program, their individual contributions, their interlocking roles, and thus their priorities. The conference used both the lecture demonstrations of plenary sessions and the vigorous interactions of parallel workshops on various specialties to review the state of the art, to critically examine the state of the effort, and then to discuss future needs. As implicit in the conference, some examination of philosophies, guiding policies, and current trends may be in order in this introduction to a series of papers and abstracts condensing 4½ days (and numerous evening hours) of thoughtful discussions.

Some major concepts in prosthetics research are the transition procedure, the clinic team, several forms of specialized prosthetics education, and the need for interdisciplinary contributions. All are aspects of a greater whole. The basic theme of cooperation—of individuals, of disciplines, of intramural and contractual research projects, and of the total VA prosthetics research program with those of other sponsors and with related VA clinical programs—intertwines throughout the entire structure.

One of the characteristics of the broad field of prosthetics research since World War II, has been the transition procedure. Close liaison with the clinical program brings recognition of clinical needs. Research ideas for solving them are carried through successive interations of development, evaluation, and refinement, leading to reevaluation. The new concept is launched through pump-priming purchases in low volume of temporarily expensive test models. Then systematic clinical trials are conducted with assistance of selected clinic teams. Education is launched for the several disciplines typically involved. Eventual

placement of the item "under contract" with the Veterans Administration then allows nationwide procurement under specific conditions. These centrally guided prosthetics contracts now routinely require fitting under supervision of a VA Qualified Prosthetist. Often they also include additional special requirements, such as specific short, intensive courses at university postgraduate programs to impart to the prosthetist new principles and skills in special techniques. This pattern suggests analogies for other fields.

Similarly, in the fall of 1974 new courses in electronic travel aids for the blind have been launched at Western Michigan University, with the aid of the VA Assistant Chief Medical Director for Academic Affairs and the cooperation of the Chief, Blind Rehabilitation. These courses assist not only in final clinical evaluation of new mobility aids but also in expanding clinical use by both veterans and nonveterans. These aids include two non-VA developments—the Binaural Sensory Aid designed by Prof. Leslie Kay and developed by Wormald Vigilant, Ltd., with the help of the New Zealand government and the simpler ultrasonic Pathsounder designed by Lindsay Russell in conjunction with the MIT Sensory Aids Evaluation and Development Center headed by Prof. Robert W. Mann and supported by Social and Rehabilitation Service. Thus these transitional concepts can be useful, especially in the later and increasingly expensive stages, not only to a developer like Bionic Instruments working under VA research contract on the laser cane but also to developers sponsored by other governmental agencies or by private funds.

The clinic team concept was largely (though not entirely) fostered by the prosthetics research program. The week-long suction socket schools, beginning late in 1947, brought together surgeons and prosthetists, and the followup added therapists. The upper-limb case study at UCLA in 1950-51 refined the prescription and check-out concepts. The upper-limb postgraduate schools at UCLA, beginning with a pilot course for Chicago University-based teams in 1952, continuing routinely for other teams after 1953, and supplemented by a field study operated by New York University, recognized some 85 teams. This team concept soon was widely used by many agencies in the United States; repeated surveys by the National Research Council have shown some 400 prosthetics clinic teams in operation.

The clinic team concept was also introduced into international practice through the International Society for Welfare of Cripples and its successors, especially through their International Prosthetics Courses, beginning in Copenhagen in 1957. The current International Society for Prosthetics and Orthotics appears to assume that interdisciplinary clinic teams are essential for adequate care of patients.

Similarly, interdisciplinary Visual Impairment Service Teams (VIST)

have been developed within the Veterans Administration. Logically this concept of organized interdisciplinary service to the blind and visually handicapped, long used by some pioneers, likewise should spread to other agencies and nations. One may hope that the special educational programs being developed at Western Michigan University on mobility aids for the blind for already-certified orientation and mobility instructors will be expanded for other disciplines and for entire teams. Topics for broader education eventually should include aids to overcome reading and additional problems not only of the totally blind but also of the much larger numbers of visually impaired individuals retaining partial sight.

Not only at the clinic team level in serving specific patients but also at the research and development stage in helping broader categories of patients, interdisciplinary cooperation is important, indeed usually crucial. The goal is to serve real needs, best defined by clinicians in contact with a broad spectrum of patients.

Cooperation between projects, too, is important in relatively rapid movement of research ideas to routine use. Historically, for example, the Berkeley and Los Angeles campuses of the University of California have produced important basic data. Many other projects under various sponsors have used these data to develop novel devices to improve the function of amputees. Both Mauch and Dupaco, for example, designed the patterns of drilled holes in their swing-phase control bushings from UC-BL data on knee torques, movements and timing to simulate normal gait. Conferences and workshops organized by committees of the National Research Council long have been effective in promoting such cooperation among laboratories supported by various sponsors, sometimes on an international level.

The conference reported in this issue brought together project leaders from both intramural and contractual laboratories. In a sense, this issue provides a snapshot of the status of numerous aspects of the VA prosthetics research program in mid-1974.

Perhaps the broadening of the prosthetics research program is the most striking impression for long term participants. Though work continues vigorously and with new approaches on such topics as locomotion, fitting of artificial limb sockets, or externally powered artificial arms, and the sensory aids program has long been active, there are now vigorous programs on relatively new areas. Selection of sites for amputation (or, indeed, prevention of amputation), wound healing of amputation stumps, and electrical stimulation for muscle activity, for feedback of sensation, or for accelerated bone repairs, are examples. Numerous types of equipment are being developed or evaluated for the spinal-cord-injured to use in the hospital, at home, on the job, and in transportation. Ingenious powered wheelchairs are under development

to provide not only new functions but also greater safety during travel in specially modified vans. New technical possibilities for serving the severely disabled and new legislation are factors in the broadening scope of the program.

In addition to the numerous obvious opportunities for fostering cooperation within traditional subdivisions, and for helping patients with multiple disabilities, the conference led to some new insights. One participant, who previously had been concerned with control of externally powered artificial arms and with novel techniques for measuring myoelectric signals, began to work with an audiologist on new instruments to manipulate speech signals for the hard-of-hearing. A clinical gait analyzer being developed for study of orthopedic impairments may also be useful for quantifying changes of gait pattern of a blind person as he is trained with a new electronic mobility aid. New materials for cosmetic restorations may also be useful for cosmetic covers of modular limb prostheses. The closed-circuit TV magnifiers which have been clinically evaluated for the partially sighted may also simplify reading tasks for certain quadriplegics. Knowledge of a critical survey of the literature on surgically implanted electrodes added to the background of a participant who was to review concepts for electrical stimulation of audition.

As a motion picture is a series of snapshots, so the successive issues of this Bulletin should provide in formal papers and in progress reports a view of a changing, complex, yet integrated program. The 10-year index in the last issue not only provides a guide to past positions but also, by dates and numbers of citations, provides some clues to historical trends. One may hope that future issues, like subsequent frames, will show steady, even accelerative, progress toward wider dissemination of better aids and techniques for some of the most seriously handicapped people in this country and the world.