REPORTED ABROAD*

LIMB TRANSPLANTATION: A SKEPTIC'S VIEW

Dr. Rolf Dederich, Director of the Orthopaedic Department of the St. Petrus Hospital in Bonn, expressed skepticism over press reports of successful reattachment of severed limbs in an article that appeared in *Orthopädie Technik,* January 1963. He stated that there was not the slightest reason to believe that transplantation of extremities from cadavers to amputees could succeed. Although Dr. Dederich acknowledged the possibility of reattaching a severed limb, he asserted that under no circumstances could previous function be restored. He also pointed out that since even skin homografts between parents and children and between siblings (nontwin) were rejected, there was little likelihood of a whole part, such as a finger, not incurring far greater difficulties.

In Dr. Dederich's opinion, press reports of reattached limbs succeeded only in arousing false hopes in too many amputees throughout the world.

A "NATURAL" ARTIFICIAL IMPLANT?

The success of colloid chemists at the University of Kiel, West Germany, in reconstituting the aorta of a cow (by infusing cadmium ions into the sols of the three main structural layers, causing partial discharge and dehydration of the particles and ordered gelation) leads Dr. Heinrich Thiele to believe that his colloid system may be used in making artificial parts for surgical implants. He believes, according to *Chemical and Engineering News,* June 15, 1964, that such parts would be superior to plastic parts now being used and would pose fewer problems.

The Kiel colloid chemists used a frozen aorta, and after removing the fat and connective tissue, separated the aortic layers, which were then reconstituted over porous clay tubes hung in sol-filled test tubes containing mucopolysaccharides. After injection of a cadmium nitrate solution, the electrolyte diffuses through the clay into the sol, forming a cadmium gel around the tube, which is analogous to the original intima. After further treatment, the gel tube is stripped from the clay tube and the cadmium ions replaced by hydrogen ions from dilute hydrochloric acid.

The process is reversible; adding alkali dissolves the gel back into the sol, but the gel can be reformed also.

Dr. Thiele's work is based on his observation that certain ions diffuse into sols of certain fibrous colloids and arrange the particles to form gels similar to the natural substance.

According to Dr. Thiele, layers of a cornea (cow) and an entire lens have been dissolved and reconstructed by this method, and attempts at rebuilding bone, teeth, and skin will be made in the future.

CONTEMPORARY STATE OF PROSTHETICS: U.S.S.R.

In summing up the prosthetics-orthotics work of the past few years in a series of U.S.S.R. collectives, institutes, and work shops, B. P. Popov concluded, in the December 1963 issue of *Orthopedics, Traumatology, and Prosthetics,* that the field

*Based chiefly on translations by Dr. Gabriel Rosenkranz, Medical Consultant to the VA Prosthetics Center.

of prosthetics has its own special method of research. He cited as assignments for this "new, developing specialty": (1) The posing of theoretical questions and the discovery of quantitative methods for designing devices to substitute for lost limb function; (2) The development of means for obtaining necessary data on all aggregates of individual characteristics that must be considered in the preparation of prosthetic-orthotic devices; and (3) The processing of these data and subsequent designing and fabrication of individual prostheses based on such information.

Popov also pointed out that although future prosthetics-orthotics research should be grounded on solid theoretical principles, only the first attempts had been made toward developing such theories in the U.S.S.R.

ELECTRONIC HAND, YUGOSLAVIA

According to *Medizinische Technik* (December 1963), a functioning model of an electronic hand had been demonstrated in Belgrade, Yugoslavia. The prosthesis, including a small electromotor, weighed only 450 grams; the power source, carried separately, weight 1.5 kilograms, including batteries. This "electrohand" reportedly provided the amputee with voluntary control of "all" movements, which were actuated by muscle or skin reflexes. Prehension forces varied according to the character, contour, and weight of the contacted object. With normal "finger" positioning, the amputee is able to handle fragile and smooth items such as glassware, balls, and cylindrical objects and to perform such tasks as lighting a match and writing with pencil or pen. It is reported that commercial production of the Yugoslavian electronic hand is expected within two or three years.

AN AID FOR THE PARALYTIC

News of a device demonstrated at a Symposium of the British Society for Aids to Spastics appeared in the May 1964 issue of *Medizinische Technik* as well as in British and the American press. According to these reports, the electronic apparatus enables an almost completely paralyzed person to use such equipment as a telephone and typewriter.

Named "Possum" from the Latin for "I can," the instrument is said to be activated by "suck-and-blow" mouthpower of the patient. With practice, the patient is able to perform such tasks as turning the pages of a book and turning on and off switches. To date, only limited use has been reported.

The instrument was developed at the Electromechanical Testing Laboratory for Aids for the Disabled with support from the British Research Fund for Infantile Paralysis.

PLASTIC ADJUSTABLE COUPLING

In his article on "Dynamic Alignment of Artifical Legs with the Adjustable Coupling," which appeared in the Spring 1963 issue of *Artificial Limbs,* Mr. Anthony Staros discussed the need for an adjustable apparatus which may become part of the final prosthesis to eliminate the alignment transfer process. In his editorial comment in the same issue of *Artificial Limbs,* Dr. Eugene F. Murphy reiterated the need for such a light expendable coupling.

An experimental model of a device that may meet these criteria was described in the October 1964 issue of *Orthopädie Technik.* According to Ralf Uhlig, Director of the Federal School of Orthopedic Technology in Frankfurt, Germany, a plastic adjustable coupling device has been developed at the Federal School, and a series of tests are in progress. An experimental model of this unit was demonstrated at the Ninth World Congress of the International Society for Rehabilitation of the Disabled during its June 1963 meeting in Copenhagen.

Made of a polyacrylic nitrile resin, the adjustable coupling, sized for the individual patient, is attached to the stump socket by means of a plastic plate. A cylindrical plastic block is threaded to screw onto the plastic plate at one end and onto the SACH foot screw at the other.

After a series of gait trials with the amputee, any necessary adjustments can be made by warming up the thermoplastic material with a special hairdrying-type heater. When plasticity is achieved, the prosthetist can, if necessary, bring the stump socket into proper alignment with the foot; he can also change the angle of abduction or adduction or the degree of flexion or extension. To change the height of the prosthesis (1 cm. limit), he need only adjust the middle vertical screw section.

Such a range of adjustment also allows the prosthetist to compensate for bowing or bending of the shank section and for any mediolateral shifting of the socket. Axial adjustments are checked with a simple plumbline, and overall patient-prosthesis alignment rechecked.

The prosthesis, with the alignment device incorporated within it, is then finished in the workshop, the exterior lamination being applied in the usual way for best cosmesis.