

## THE SECOND INTERNATIONAL PROSTHETICS TRAINING COURSE

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The International Society for the Welfare of Cripples is the leading organization in the field of rehabilitation for the handicapped, with member organizations in 43 countries. The Society conducts a World Congress every third year, in addition to regional meetings in many areas of the world. At the World Congress in Stockholm in 1951 it was decided to establish a Committee on Protheses, Braces and Technical Aids. It had been realized that this field required rather specific approaches which could best be handled by a special committee.

Mr. Glenn Jackson, Executive Director of the American Orthotics and Prosthetics Association, was a charter member and the committee has gradually been enlarged to the present membership of 22, with headquarters in Copenhagen, Denmark, under the chairmanship of Dr. Knud Jansen, with Dr. J. Saugmann-Jensen as Secretary. The primary aim is to provide better information in the area of protheses, braces and technical aids. For this purpose a library is maintained where pertinent publications are collected and disseminated, such as research reports, journals of organizations working in this field; and also such films as are of help in the educational process.

At the World Congress at Scheveningen in 1954 it was decided to organize and conduct an international training course if sufficient interest for such an undertaking should exist. Questionnaires were distributed. When the definite need and interest were established, the first prosthetics training course was conducted in Copenhagen, following the World Congress in London in 1957. This course took place at the Orthopedic Hospital in Copenhagen, where almost ideal facilities exist for such an effort. Through the cooperation of the International Society for the Welfare of Cripples and the Society and Home for Cripples in Denmark, it was possible to conduct this course at a relatively low cost to participants. Through funds made available by several American organizations, it was possible to provide several instructors from the United States. Other nations were also represented on the faculty of this course.

The success and great interest shown in the first course led to a second one, also conducted at the Orthopedic Hospital, from July 30 to August 8, 1959. Eighty-five students from 18 countries participated. There were almost equal numbers of physicians, therapists, and prosthetists. Whereas the curriculum for the first course had included braces and also technical aids, the second course was restricted to areas of prosthetic service, including surgery, prosthetic prescription, prosthetic devices and training.

Areas of primary importance were new techniques in lower extremity fittings as demonstrated by the American faculty and demonstrations of the construction of upper extremity protheses by the Germans. The new fitting technique for below-knee protheses which was developed by the University of California at Berkeley created great interest. From conversation among students, it appears that this item will probably be as favorably accepted as the Canadian hip disarticulation prothesis, which was introduced during the first course.

Of special interest from the American point of view were surgical procedures relating to above-knee stumps as shown by Dr. Dederich from Bonn, Germany. Dr. Henry Loon, a member of the American Prosthetics Research group, has spent considerable time in Europe investigating amputation techniques. He has cooperated with Dr. Dederich in above-knee stump revisions and also in primary amputations. Dr. Loon will probably submit a paper on these techniques at a future time.

From the prosthetics point of view, it appears that an above-knee stump fashioned according to this technique is best fitted with a closed socket where the stump is actually in contact with the end. The claims of Dr. Dederich are that the amputee has a better proprioceptive sense, that the circulation within the stump is improved, and that terminal edema will be minimized. Only one amputee was seen upon whom such a revision had been performed. He had been provided with a socket which was in complete contact with the end of his stump. When interviewed, the amputee claimed definite benefits from this procedure. Dr. Dederich stated that a considerable number of operations have been performed and wherever those amputees were fitted with a prosthesis as recommended, medical complications of long standing have been overcome, the patient has not complained of further stump problems and has worn the new prosthesis with comfort and added facility.

Another item of interest was the almost complete absence of hip joints and pelvic belts in above-knee prostheses at the Orthopedic Hospital in Copenhagen. Members of the German group present remarked that the same is true in most of the advanced German facilities. If the prosthesis cannot be suspended by means of a suction socket valve alone, a Silesian bandage or a similar suspension mechanism is resorted to. The only exception to this at the Copenhagen Hospital was one bilateral above-knee amputee who wore shoulder suspension straps.

It was surprising to see a great number of weight-bearing knees and also some hydraulic knee mechanisms. The claim of the chief Danish prosthetist was that this was necessitated by the terrain. Above-knee amputees were frequently seen using canes, the claim again being that in Europe amputees are forced to do considerably more walking than in the United States.

### **U/E Prostheses**

Upper extremity fittings as demonstrated by Prof. Hepp and Dr. Kuhn of the University of Munster, Germany, were of great interest since they differed considerably from the American practice. Artificial arms are fitted much closer to the contours of the stump. Sockets for below-elbow prostheses are almost always enclosing the condyles of the humerus and the olecranon of the elbow. In this manner the prosthesis can be suspended with a minimum of dependence upon harnessing. In a longer stump where this technique of fitting interferes with pronation and supination, a second socket is made, which encloses the terminal end of the stump rather tightly. The socket which encloses the elbow is fitted rather loosely at the distal end in order to



allow for pronation and supination which is still retained within the stump. Through the special construction of the wrist units this motion is then transferred to the terminal device.

The casting technique for their above-elbow amputations also differs from the American technique inasmuch as the cast is very accurately molded to conform to the musculature of the shoulder. The cast is carried high at the shoulder and encloses part of the shoulder anteriorly as well as posteriorly. The area between the pectoral muscles and the clavicle is depressed. The prominence of the pectoral tendon is molded into the cast and the cast also encloses the axilla. Before the cast hardens, it is molded to conform accurately to all the prominences of the shoulder joint. All casts for upper extremities are made from elastic plaster of paris bandages. Before the cast sets fully, the amputee is asked to tense and relax his muscles in order to get a good reproduction of the functional stump.

A positive cast made from such a negative shows rather severe undercuts. In order to obtain an exact plastic socket from such a cast the Danes, the Germans, and also other European technicians have resorted to a system which uses negative pressure to mold the final socket to the shape of the cast. This system has been perfected by Dr. Kuhn at the University of Munster and he has introduced it through visits and demonstrations to many other countries. At the course Dr. Kuhn fitted several sockets of different lengths for amputations below as well as above the elbow. The retention of the finished socket to the stump was rather amazing. Most stumps were pulled into the socket by means of stockinette similar to above-knee stumps and the suction socket. It is claimed that many amputees prefer to use a suction socket valve with their sockets. The harness system is not used for suspension but primarily to activate elbow flexion and the terminal devices.

A hook was demonstrated which uses a different prehension mechanism. It appears to be a combination between a hook and hand. The inventor claims great advantages for this particular hook but only a limited number have been constructed and no evaluation at this time appears to be valid.

The British members of the teaching staff discussed and demonstrated prosthetic devices for children with congenital anomalies. They differed little from those shown in the literature. The indications vary, of course, widely since the conditions change from case to case. Extensions made from cork or light wood were used in combination with molding leather and steel bars. A knee-bearing leg with adjustable knee friction for knee disarticulation stumps appeared to be advantageous.

The organization of the course was excellent, just as in the previous one. Visits to rehabilitation centers and a reception by the Mayor of Copenhagen were welcome diversions from the very strenuous schedule. A farewell party at the conclusion of the course found all participants in full agreement regarding the benefit as well as the need for further efforts along similar lines.