

# PROSTHETIC DEVELOPMENTS IN JAPAN\*

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## I. Brief Account on Welfare Services for the Handicapped.

In 1950, the Welfare Law for the Physically Handicapped was passed. This is the basic law, and its purpose is to assist the physically handicapped who endeavors to rehabilitate himself socially. Under this law, each handicapped is to be registered and carry the Handbook for Physically Handicapped issued by the local Government, in which his state of physical disorder, welfare services offered, are to be entered. He can be offered medical treatments to improve the affected physical ability, be offered prosthesis or orthopedic appliance and training in its use. The local agency who put the law in effect is the governor, mayor of the city or village. He supervises the Welfare Offices within his jurisdiction. To each Welfare Office a welfare worker for the handicapped is assigned and cooperates with other case workers to offer adequate guidance to the physically handicapped.

In each prefecture or specially designated cities, there is at least one Rehabilitation Counselling Office For The Physically Handicapped, to make accurate diagnosis on the case, and to offer proper treatments. It gives medical, psychological, and vocational aptitude tests. It also gives prosthetic or orthotic prescription and checkout.

For the betterment of physical activity, the medical treatments are offered in those hospitals designated by the Minister of Welfare.

For the post clinical treatment, psychological tests, vocational guidance, vocational training, and guidance for daily living, there are 36 Rehabilitation Centers for the Physically Handicapped. One of them is located in Tokyo, operated by Federal Government. The other 35 Rehabilitation Centers are operated by local Administration.

To meet the demand for job training exclusively for those with orthopedic handicap, there are 8 Vocational Training Centers for the Physically Handicapped, set up by the Minister of Labor and operated by local Government. There, skills in dressmaking, tailoring, watch-repairing, shoemaking, mimeography, machine drafting, bookkeeping, seal impression carving, etc., are taught under a one year program.

There are also other welfare laws for the industrial workers, such as Labor Accident Compensation Law which concerns about on-duty accident or sickness, and Social Insurance and Annuity Law which concerns about not-on-duty accident or sickness. By these laws, the handicapped are supplied with first prosthesis or orthotics if necessary, later on they are taken care of by the Law for Welfare for the Physically Handicapped.

As to war-wounded veterans, they are now protected by the Law of Compensation for War-Wounded which was passed in 1952. They are offered medical treatment and prosthesis or orthotics free of charge. All

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rehabilitation services are available to veterans as well as civilians. There is no governmental department which takes care of war-wounded veterans, such as Veterans Administration in U.S.

In 1947, the Child Welfare Law was passed and the welfare work for the handicapped children began to be carried out on nation-wide scale under the governmental program. Under this law, about 780 Health Centers serve as the front-line agency, to permit early discovery and clinic treatment services. And, as of 1957 there were constructed 26 Hospital Schools for the Crippled Children.

## **II. Number of Handicapped.**

The survey of Welfare Ministry shows that the total number of registered physically handicapped is somewhere around 800,000, excluding children. 500,000 are orthopedically handicapped, among these 45,000 are amputees. The yearly increase in total number is estimated to be 50,000. The number of war-wounded veterans is 240,000, among which 140,000 are orthopedically handicapped.

The ratio of upper extremity to lower extremity amputees is 14:10, whereas the ratio of American amputees is 3:10. This was pointed out by Mr. William A. Tosberg.

It is reported that the frequency of industrial accident in Japan is 3.4 times higher than that of American industrial factories. About 4,800 were killed, and 372,000 were injured by industrial accidents during 1955. And the number of accidents is increasing every year.

## **III. Prosthetic Services.**

There are about 180 limb shops in Japan, 120 of which are private and the rest are governmental or semi-governmental. The total number of employees is about 1,000. Roughly 60,000 prostheses and orthotics are newly made, and 20,000 to 30,000 repairs are done by these shops every year.

When a patient needs a new prosthetic or orthotic item, he must first visit the welfare worker for the handicapped in the Welfare Office which has jurisdiction over his residing district, and fill the application form. On the appointed day he goes to the Rehabilitation Counselling Office, and gets the prescription made. After 3 to 4 weeks, the authorized ticket is issued by the Welfare Office to the patient. In this ticket, the amount of charge to the patient, amount of government aid, name and location of designated limb shop, are entered. Fitting and checkout should be done in the presence of the doctor.

For the benefit of the patients who live in the remote distance from the rehabilitation service facilities, the Welfare Office offers mobile counselling service once or twice a year. This mobile service team is composed of physicians, prosthetists and orthotists, nurses and welfare worker, and offers counselling service, prosthetic or orthotic prescription, and minor repairs of prostheses or orthotics.

## **IV. Prostheses Fabricated in Japan.**

### **a. Upper Extremity Prostheses.**

Generally speaking, the upper extremity prostheses are still far behind the present day American standard.

Work arms consist of molded leather socket, Tannenburger type A/E arm body or rotation type B/E fore-arm body, and single purpose terminal devices such as O-ring, C-hook, sharp L-hook, or specially designed devices to meet the specific demand. This type of prosthesis with plastic laminate socket is particularly accepted by farmers, because of its simplicity and durability.

Cosmetic prosthesis usually consists of molded leather socket, wooden or aluminum shell, and passive hand made of wood or aluminum casting or rubber.

Functional elbow units are applied solely for bilateral arm amputees, because of economical consideration. Unilateral amputees are supplied with manual lock units.

With regard to the fact that the upper extremity amputees surpass the lower extremity amputees in their number, the introduction of modern technique of upper extremity prostheses is an urgent necessity. We are planning some number of upper extremity prosthetic courses in our Center the early part of next year.

#### b. Lower Extremity Prostheses.

##### A/K conventional prostheses:

Until recently, most sockets were made of aluminum sheet hand hammered to plug fit, lined with felt and leather and covered with leather or painted.

Today, the quadrilateral sockets are prevalent. They are made either of aluminum or plastic laminate or wood.

##### Suction socket A/K prostheses:

In 1956, three technical courses were held on the suction socket A/K prostheses under the Technical Assistance Program of U.N., conducted by Mr. William A. Tosberg, in the National Rehabilitation Center.

These were tremendously successful courses, stirring up the desire among prosthetists to extend their knowledge. Fitting and alignment principles were applied to the conventional prostheses, and as a result, as mentioned above, most of conventional A/K prostheses are of quadri-lateral socket.

Until today, we have been carrying on the same prosthetic courses in our Center, and 136 prosthetists were trained in the suction socket A/K prostheses. There will be some time necessary before this type of prostheses are fitted successfully, because;

- 1) the prosthetists must acquire more experience in fitting.
- 2) well scheduled training in prosthetic use should be given to the patients, and in this regard there is no qualified therapist to take charge of this task.

##### B/K prostheses:

Usually these types of prostheses were made of aluminum sheet hammered to shape, with felt and leather socket liner.

In 1957, two technical training courses on the Soft Socket B/K prostheses were held in our Center, under Mr. Harry R. Conrad of the Navy Amputation Center. Since then, 120 prosthetists have been trained on the similar courses held in our Center. Today, we can see that most of B/K prostheses are of closed-type soft socket utilizing plastic laminate. This type of prostheses have won applause acceptance from B/K amputees.

##### Work Legs:

Work legs are chiefly used for farming or fishing. A/K work leg is composed of aluminum socket with detachable insert, prefabricated steel frame, and a Dollinger type foot. Several pieces of strip cut out from used car tire are tacked on the foot sole. B/K work leg is similar to the soft socket B/K prostheses except that the Dollinger foot is attached instead of conventional foot.

These are very useful because of easy farming activity, low maintenance cost and durability.

Some characteristics of Japanese Prostheses:

(1) Knee-Lock Mechanism.

Many of A/K amputees want the knee-lock mechanism to be attached. The following facts may account for this;

- i. Too heavily crowded transportation. For those who are commuting by bus or trolley or tram car, there might be every chance at any moment to be struck at the back of prosthesis.
- ii. Complexity of footwear.  
Usually we Japanese must take off shoes for indoor walk. Shoes, getas, or sandals are only for outdoor walking. To accommodate these changes, we sometimes are compelled to put knee-lock mechanism on the prostheses, with sacrifice of walking gait, and with much more reluctance.
- iii. Lack of understanding on the part of patient, and lack of training in use.

But, the tendency is that the knee-lock mechanism are applied less frequently.

(2) Shoulder Suspension.

Shoulder suspension strap, together with roller-and-leather strap suspension is commonly used for conventional A/K prostheses.

(3) Range of Knee Flexion.

Greater range of knee flexion is necessary in most of lower extremity prostheses. This comes from necessity in indoor activities.

## V. What Should Be Done for Furthering the Prosthetic Services in Japan?

After ten years since the start of welfare services in Japan under Governmental program, there still remain serious defects in the prosthetic services which should be supplemented in a possibly short time.

First, prosthetists lack the knowledge in modern prostheses fabrication technique.

Second, lack of qualified therapists makes it impossible to train the amputee in prosthetic use, nor is it impossible to afford team activity in prosthetic prescription, checkout.

To correct these defects, the following measures should be considered:

(1) Training Courses for Prosthetists.

Further training courses for prosthetists on various prostheses should be held. Upper extremity prosthetic courses are of urgent necessity, then other types of prostheses such as UCB-type B/K, Syme prostheses and hip-disarticulation prostheses, etc. I am happy that I can be of some help in this area, as I had the chance to attend training courses held in N.Y.U. I am envious of American prosthetists that they are trained in a well equipped school, by experienced faculty members under superbly arranged program. In contrast, our prosthetists are trained in our Center where machines are of a type more than 20 years old.

(2) Training of therapists.

As I said before, there is no qualified therapist available in Japan. Training of therapists should be taken up by Government as soon as possible. There are many hospitals well equipped with physical therapy equipments, and yet these equipments are not utilized because of lack of therapists.

Furthermore, therapists are needed for training of patients in prosthetic use and prosthetic checkout.

I wholeheartedly am awaiting the day, when the well organized team activity among physicians, prosthetists and therapists will be offered to the benefit of amputees of Japan.