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### Prosthetic and Orthotic Education for Physicians and Prosthetists / Orthotists

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# PROSTHETIC AND ORTHOTIC SERVICES IN THE REPUBLIC OF CHINA\*

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## Law and Social Welfare System for the Disabled

The Republic of China in Taiwan has enacted three social insurance systems -- insurance for the Military Servicemen since 1950, Labor Insurance started in 1956, and Insurance for Government Employees in 1958. Under these insurance systems, the medical payments for injury and sickness have been covered, as well as long-term beneficial payment for disability, old age and death. At the end of 1979, an estimated 7.6 million citizens of the nation's 17.5 million population were covered by this government's social security system.

The Welfare Act for the Disabled came into effect in June 1980, which combining with the formerly existing two Welfare Acts -- the Welfare Acts for the Children since 1973 and for the Aged since 1977, became the milestones in the history of national effort against disability.

For veterans, all prosthetic and orthotic equipments were supplied freely by the government. But for other citizens, the prosthetic or orthotic appliances were not covered in the insurance system until 1980, the laborers were allowed to have their first prosthesis paid by the Labor Insurance. Nevertheless, a welfare system for physically handicapped persons of low income families has been carried out by the Department of Social Affairs of the government for seven

years to supply those rehabilitation devices freely. According to the Welfare Act for the Disabled enacted in 1980, the government will pay the subsidy for all users of prosthetic, orthotic and other rehabilitation equipments without distinction to the economic classes.

## Statistics about the Disabled

Unfortunately, so far there is no national statistics about the total number of the disabled in this country. A nationwide survey for the disabled was attached to the national population census on December 28, 1980. The Ministry of Interior is now working evaluating and identifying cases from the basic information of the census. From this procedure of evaluation and identification, we hope an official figure of the population of handicapped persons will be obtained in near future.

A survey for the new amputation of extremity during 1979-1980 was made recently by the speaker, sponsored by the Ministry of Health. The survey covered more than 90% of major hospitals which performed surgical amputation of the limbs. Totally 1,958 cases received surgical amputation during the period of two years. In other words, about 1,000 persons join the group of amputees each year in this country.

Among 1,958 cases, there were 1,523 males (77.8%) and 435 females (22.2%), 1,144 upper

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extremity amputees (58.4%) and 814 lower extremity amputees (41.6%). Trauma is the main cause of the amputation (62.7%) in general, especially in the upper extremity amputees. Vascular problem (12.5%) and infection (12.5%) came to the next. Cancer as the cause of amputation consisted of only 4% and some other miscellaneous causes of 8.3%. More than half of the upper extremity amputees (51.6%) were at the age between 11-30 years old, while 54.9% of lower extremity amputees were at the age beyond 50 years.

However, if excluding the minor surgery, such as finger, thumb, toe and partial foot amputations which cause only minor disability, there were 902 major amputations of limbs during these two years. Among them, 678 cases (75.2%) were males, and 224 cases (24.8%) females. There were 708 cases (78.5%) underwent ankle or above amputation of lower limbs, and 194 cases (21.5%) hand or above amputation of upper limbs. The percentages of the causes of major amputation were 43.1% due to trauma, 21.6% vascular origin, 20.7% infection, 7.4% cancer and 7.1% others. Around 59.2% of major amputation of upper extremity were at the age group between 11-30 years old, while in lower extremity, 54.2% were at the age group of over 50 years.

Blackfoot disease, an endemic peripheral vascular disease among the inhabitants of the south-west coast of the island due to long-term consumption of high arsenic water from artesian wells in that area, is one of the main causative disease for limb amputation in this country. It caused 6.3% of total limb amputations, mainly in lower extremity (123 out of 124 cases) in this survey. A field survey in the endemic area made by the speaker in 1972, revealed the incidence of amputation in this particular

disease was 45.8% (199 out of total 434 cases surveyed). About 92% of the cases had amputation in the lower limbs, 4% in the upper limbs and 3.5% in both upper and lower limbs.

In 1966, a national-wide case by case survey was carried out by the Ministry of Education cooperated with the Ministry of Health for the school-age children, from 6 to 12 years of age, and the number of the disabled was estimated at 34,564, about 1.47% of the total school-age population of 2,350,000. It divided as: visually handicapped 989 cases (2.9%); auditory handicapped 2,154 cases (6.2%); orthopedic handicapped (mostly the victim of poliomyelitis) 9,317 cases (27.0%); chronic diseases and delicacy 1,185 cases (3.4%); mental retardation 12,034 cases (34.8%); multiple handicapped (mostly victims of cerebral palsy) 5,374 cases (15.6%) and unclassified 3,511 cases (10.2%). The number of poliomyelitis victim decreased sharply in children population recently due to successful vaccination. On the contrary, the victims of cerebral palsy seems increasing in number proportionately, that draws more attention in medical, educational and social aspects.

In adults, cerebral vascular accidents (CVA) and spinal cord injuries (SCI) are the two main causes of paralysis which need rehabilitation and orthotic appliances. CVA is the first killer in this country. It is estimated that about 10,000 persons died in CVA, and other 30,000 CVA victims who may survive and need rehabilitation each year.

Increased incidence in SCI drew our attention recently since the country escalate its pace in industrialization. A survey carried by one of my staff to the main 15 general hospitals in northern part of the island that covering about half

population of the country, revealed 248 cases suffered from SCI during two whole years in 1978 and 1979. Among them, 204 cases were males, 44 cases females, mostly (29%) in the third decade of age. There were 59 quadriplegia, 57 quadriparesis, 74 paraplegia and 58 paraparesis, with 16 cases died during acute phase of injury. Traffic accidents were the main cause, and responsible for about one third of the trauma.

#### Number and Education of Professional Personnels

The first prosthetic and orthotic workshop in the Republic of China was set in Nanking Rehabilitation Center in 1945. The center was then moved to Taiwan in 1949 due to the Chinese Communist rebellion. Presently, there are 25 prosthetic or orthotic workshops in Taiwan area, and only three of them are public. Among those shops, about 10 provide only orthotics, 5 only prosthetics, and other 10 shops both prosthetics and orthotics.

Since there is no strict law concerning the prescription of prosthesis or orthosis in this country, all physicians, mostly orthopedists and physiatrists are eligible to prescribe prosthesis or orthosis for their own patients. However, the fact is no more than 20 physicians, 60 physiotherapists and 20 occupational therapists who are working closely with the workshops.

So far, the country has no registration system for the rehabilitation personnels, such as P.T., O.T., S.T., prosthetists or orthotists, nor the former education program for S.T., prosthetist or orthotist although 4-year university courses for P.T. and O.T. have been established in National Taiwan University for more than 10 years. Naturely, there is no clear picture about the number of those personnels. It is estimated rough-

ly that there are more than 80 prosthetists / prosthetic technicians and 100 orthotists / orthotic technicians currently working in the workshops. Most of them, are insufficiently trained.

Nevertheless, in 1971, two basic courses for prosthetic and orthotic technicians were conducted at Cheng-Hsin Rehabilitation Center in Taipei, by WHO consultant in prosthetics and orthotics, Mr. B. Leano from the Phillipines. Each course lasted for 6 months, recruited 17 and 8 persons respectively.

The International Prosthetic and Orthotic Training Center has set up a branch in the Republic of China and an international 25-week training course for prosthetists and orthotists has been conducted annually since 1979 by Mr. Juan Monros with joint sponsorship of the World Rehabilitation Fund of New York and the Veterans General Hospital of the Republic of China. The first course took place from February to June 1979, enrolled 19 students, 12 in prosthetics and 7 in orthotics, from 9 Asian and Pacific countries. The second course was held from September 1980 to February 1981, accommodated 17 students from 4 different countries in Asia, 10 in prosthetics and 7 in orthotics.

For many years, most of medical students in this country has had two hours of lecture concerning about prosthetics and orthotics, and one more hour lecture in the rehabilitation of amputees. Resident physicians in the Department of Physical Medicine and Rehabilitation of National Taiwan University Hospital, are scheduled to have about 30 hours of advanced lecture in prosthetics and orthotics in addition to clinical experience in the prosthetic and orthotic clinic once a week during their first year residency. In the School of Rehabilitation Medicine, National Taiwan University College

of Medicine, the students in P.T. and O.T. are given 80 and 64 hours respectively about the prosthetics and orthotics. However, there is no postgraduate short-term course in prosthetics and orthotics held for those personnels.

#### Supply and Prices of Prostheses and Orthoses

Although almost all raw materials and parts in the manufacture of lower extremity prosthesis can be available locally, the country has to import most of raw materials for orthotics, and some parts for upper extremity prosthesis, such as elbow unit, hook and functional hand, mostly from Hosmer Co. and USM Co. in U.S.A. and Otto Bock Co. in West Germany.

The price of prostheses and orthoses in this country ranges very widely, depending on the materials used and the nature of workshop; public or private. The following prices can be available in the government running workshops, while in private workshop, the prices may be far beyond that.

Hip disarticulation prosth.,	
Canadian type.....	US\$320
Hip disarticulation prosth.,	
endoskeletal type.....	400
A-K prosth.	
Quadrilateral suction socket,	
single axis knee.....	210
Quadrilateral suction socket,	
endoskeletal with stance	
phase lock knee.....	400
Quadrilateral suction socket,	
endoskeletal with hydraulic	
knee.....	840
Knee Disarticulation Prosth.,	
endoskeletal.....	400
B-K prosth. (PTB socket).....	145
Syme's prosth.....	145
Shoulder disarticulation prosth.	400
A-E prosth.. (body-powered,	

functional elbow joint,	
and hook).....	US\$330
B-E prosth. ....	224
Long leg brace (metal).....	160
Short leg brace (metal).....	92
Wheelchair (standard type).....	200

#### Problems Concerning Prosthetics and Orthotics

In summary, there are several problems exist in the Republic of China concerning about the delivery system of prosthesis and orthosis to the disabled, which need to be improved in future.

1) There is no common regulation in the prescription and checking-out system for prosthesis and orthosis. Presently, the users can purchase those rehabilitation appliances directly to the workshop without through the medical prescription.

2) There is no national standardization about the manufacture of the prostheses and orthoses. In other words, there is no quality control.

3) Consequently, the prices of the prostheses and orthoses are ranging very widely. A prosthesis from one workshop is sometimes several times in price than those from the other, which confuse the rehabilitation personnels and the users very much.

4) The social welfare system in this country covers only in part the expense of the prosthesis and orthosis. Most of the disabled still have to pay for their own devices.

5) There is no former education system for the prosthetic and orthotic personnels which leads to the national licensing to these professions.