

Indigenous substitutes for modern prostheses and orthoses

T. ABAYOMI OSHIN

University College Hospital, Ibadan, Nigeria

Abstract

In most developing countries, the physically handicapped often have rehabilitation setbacks such as unavailability of modern rehabilitative aids which may result in non-achievement of the desired goals in activities of daily living. Children with poliomyelitis, hemiplegics, amputees and paraplegics top the list of patients requiring rehabilitation at University College Hospital, Ibadan. The amputees depend on wooden peg legs or pylons made by the occupational therapy department since modular and P.T.B. prostheses are presently not available in this hospital. Physiotherapists, therefore, encounter problems in teaching correct patterns of walking and other functional activities to the above-knee amputee because knee joints are absent. Rural amputee farmers use pylons as they can wade through water and mud with them.

Calipers, toe raising devices, knee cages and spinal supports are required by 75% of the 300 children with poliomyelitis and some of the paraplegics receiving physiotherapy in this hospital.

Due to lack of imported parts, materials and experienced personnel, it has not been possible to meet the required demands. The occupational therapy department, as well as indigenous shoe makers and iron welders, rescue the situation as much as possible. Similarly, cervical collars are made from PVC buckets.

It is therefore necessary that research on the use of local materials for prostheses and orthoses be carried out. Difficulties encountered with imported parts and materials will be removed to the advantage of patients.

All correspondence to be addressed to Mr. T. Abayomi Oshin, Senior Lecturer, University College Hospital, Ibadan, Nigeria.

Introduction

In most developing countries the physically handicapped suffer a lot of setbacks during and after the period of rehabilitation.

One setback is the unavailability of sufficient assistive aids which could help to hasten recovery and the achievement of activities of daily living.

The physically disabled commonly treated at the University College Hospital, Ibadan, are amputees, hemiplegics, and children with poliomyelitis and cerebral palsy.

The amputees were dependent for ambulation on peg legs and wooden prostheses (Fig. 1, left) made by the occupational therapy department. Patellar tendon bearing and modular types of prostheses are presently not available. The government-owned workshop in Ibadan made some of these prostheses a few years ago until this became impossible due to shortage of



Fig. 1. Left, above-knee prosthesis manufactured from local materials. Right, long leg caliper.

equipment and experienced personnel. Imported willow wood was used extensively for making both the above and below-knee artificial limbs in the workshop.

In the case of above-knee amputees, physiotherapists found it difficult to teach the correct pattern of walking, climbing and descending stairs and other functional activities which involved the lower extremities because the prostheses made by the occupational therapists had no knee joint. When one exists, the heavy artificial limb (made of local wood) together with improper alignment makes rehabilitation difficult. However, the efforts of the occupational therapists are commendable in the absence of other means of ambulation.

Supportive aids

About 225 (75%) of the 300 children with poliomyelitis and cerebral palsy who attend the outpatient department for physiotherapy require some form of walking aid depending on the degree of muscle imbalance and deformities of the affected limbs.

In order to avert contractures which may lead to gross deformities, the supportive aids applied were: 1. Plaster of Paris back and night splints to prevent hamstrings and tendo Achilles contractures respectively; 2. Plaster of Paris cylinder to correct genu recurvatum; 3. Plaster of Paris hip spica to prevent or correct tensor fasciae latae contractures; 4. Spinal jacket to arrest paralytic scoliosis.

All of the above are currently made by both the physiotherapists and the plaster technicians and are regarded as temporary measures. Rubber shoes made from old inner tubes and worn out motor tyres protect the plaster from wear at the soles.

Permanent rehabilitative aids

Permanent rehabilitative aids which may not require frequent changes were made by prosthetists and orthotists where possible.

These aids were a. Long and short leg calipers with ring or cuff top and posterior or anterior stops; b. Toe raising devices (with springs or rubber attachments); c. Knee cages; d. Spinal supports made with block leather or in the form of simulated Milwaukee brace. In the case of upper extremities, cock-up splints were made of plaster of Paris, Orthoplast and aluminium when the latter is available.

Patients from the University College Hospital, Ibadan were often referred to the government-owned orthopaedic workshop in Ibadan until 1976 when materials and manpower resources became inadequate. Both the occupational therapy department and indigenous ironmongers and shoemakers came to the rescue.

Iron rods and flat iron bars used in building industries were substituted for the acceptable lightweight and jointed aluminium bars. Tanned goat and cowhide were used as leather components of calipers and knee cages.

Long leg calipers (Fig. 1, right) have no knee joint and are not adjustable for length in order to accommodate the growth of the children. These were rather expensive for some poor parents who had to pay for the appliances so frequently.

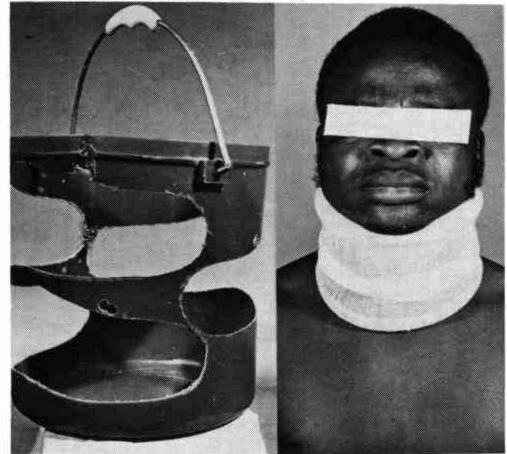


Fig. 2. Left, plastic bucket showing patterns for cervical collar. Right, cervical collar applied.

Cervical collars

Patients suffering from osteoarthritis of the cervical vertebrae, whiplash injuries and others are requested to wear cervical collars for the purpose of temporarily restricting the movements of the neck, gaining relaxation of the muscles of the neck which may be in spasm and to relieve neck pain.

The cervical collars issued to patients in most hospitals in Nigeria were imported and made of plastic materials or foam rubber. Nevertheless, in some teaching hospitals and orthopaedic workshops, cervical collars were made to

measure by using Plastazote, Molefoam or Zoplafoam and Orthoplast.

Quite lately, restrictions have been applied to imported goods by the federal government; these necessitated improvisation and indigenous "manufacture" of cervical collars by the author from pliable plastic containers e.g. buckets and large bowls which are readily available in the markets.

Varying sizes and patterns were cut from the plastic buckets (Fig. 2, left). The edges were rounded off and padded with rubber tubing. The collars were applied with the aid of stockinette (Fig. 2, right); perforations were made on the collars for ventilation.

Discussion

Hundreds of children suffering from poliomyelitis require the appropriate rehabilitation aids in Ibadan and in fact in Nigeria as a whole if they are not to be severely crippled for life and perhaps resort to begging.

There are very few (about 5) workshops in the whole of Nigeria (population 80 million) where the infrastructure, machinery and materials required for the manufacture of prostheses exist. The major constraints have been non-availability of materials (which are mostly imported) as well as experienced manpower. Unless these shortcomings are recognised and remedied, local shoemakers, ironmongers and welders will continue to come to the aid of the disabled no matter how primitive or lacking in functional restoration their products may be.

In Nigeria, it is socially necessary for a woman to wear a jointed above-knee prosthesis. Custom demands that she should genuflect when greeting an elderly person. Local fabrication of parts is therefore essential in order to meet the

requirements of the local taboos demanded of some amputees.

Conclusion

In conclusion it is of paramount importance that import restrictions should be relaxed and custom duties abolished completely on major appliances used by the disabled in developing countries. This should continue until the components of rehabilitation aids can be manufactured at local level as a form of appropriate technology.

Training of manpower should be intensified at all levels including prosthetists, orthotists, physiotherapists, occupational therapists and others who, by working as a team, contribute to the functional restoration of the disabled and their return to normal activities of daily living.

Acknowledgements

I would like to express my thanks to the Occupational Therapy Department and the Bio-Medical Illustration Unit of University College Hospital, Ibadan for information and illustrations respectively. I also wish to thank Miss M. O. Ajayi (Confidential Secretary) for secretarial assistance.

BIBLIOGRAPHY

- BAIN, A. M. (1964). Experience in rehabilitation in Uganda. In: Proc. First Symposium on Rehabilitation in Africa, The National Fund for Research into Poliomyelitis and other Crippling Diseases, London, 88-95.
- GOLDING, J. S. R. (1976). Health care delivery for the disabled. The Commonwealth Foundation—Occasional Paper XLI, 40-43.
- KIRMAN, S. R. A. (1966). Prosthetics in Pakistan. *Pros. Int.*, 2:6, 4.