

# **Prosthetics and Orthotics Services in Landmine-Affected Countries in the Developing World: A personal view from Cambodia**

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Landmine victims have been the focus of attention since the formation of the International Campaign to Ban Landmines (ICBL), and this naturally peaked in 1997 with the signing of the Ottawa agreement. This event, while incredible, needs to be looked at as part of an ongoing process in the rehabilitation of people with mobility impairment living in low income. These are often considered as only landmine victims, but the context is wider. While the continuing work of ratification, awareness raising, advocacy planning etc. goes on, it is useful to look at the context of the ongoing work in rehab, the lessons learned and the challenges still to be faced.

The work in Victim Assistance (VA) is dynamic, a pillar with little history. The prosthetic industry as we know it today in the developed world is little more than 35 years old. We are learning and the countries themselves are learning. We have no need however to re-invent the wheel when it comes to planning; so much has been done already.

For the past six years I have worked in Phnom Penh, Cambodia, with a small British organization called The Cambodia Trust. Cambodia is well known to many as one of the world's most densely landmined countries. It has suffered nearly 30 years of war, as the conflict in Vietnam spilled across its border, but is also infamous for the Pol Pot regime in the mid 70s. After that dark period the country was isolated from the international community until the late 80s making it desperately poor and under developed. The intellectual middle class had been wiped out by the genocide leaving a largely peasant population where literacy was virtually zero. The Civil War, post Pol Pot, lasted until the Paris peace accord in 1992, and up until earlier this year there was still sporadic fighting and dislocation as the hard-liners held out in the jungles. As a result the country is extremely poor, civil society is embryonic, and education standards are low. More than 80 percent of the population are subsistence farmers with little access to a cash economy. It is against this backdrop that some 160 organizations including, Cambodia Trust, are working.

The trust has been working in Cambodia since 1992 and has developed three prosthetic service centers under the auspices of the Cambodia Trust Rehabilitation Project in Kompong Som, Kompong Chanang and Kieng Svey. It is the largest service provider in Cambodia, producing more than 1,200 prostheses and 400 orthoses in 1997-1998. The Trust's largest project, The Cambodian School of Prosthetics and Orthotics (CSPO), which includes a large rehab clinic, is based in Phnom Penh, the capital. The CSPO is the national training scheme for Prosthetics and Orthotics (P&Os) and works in collaboration with five other organizations: American Friends Service Committee (AFSC), Handicap International, Veterans International, American Red Cross and International Committee of the Red Cross, and of course with the Government of Cambodia to build human resources in that country. The school has been working very closely with the International Society for Prosthetics and Orthotics (ISPO) to bring the curriculum within the guidelines set down by ISPO in October 1997, for the training of Category II Orthopedic Technologists, or prosthetist orthotists.

## **Status of the CSPO**

The CSPO opened its doors in 1994 with an intake of six students. In subsequent years the intake has risen to 12 and as a result we have now three graduating classes with 27 new Prosthetist/Orthotists and another 43 in the pipeline. As we reach our initial estimated 1993 target of 60 graduates for the Cambodian service, we have looked more seriously at developing a regional role, and for the first time, last year, we took two students from the Laos Peoples Democratic Republic. This year we have six from Laos, two from Sri Lanka and one from the Solomon Islands. The remaining three are Cambodian. One possible future for the CSPO is that we generate income by taking in fee-paying overseas students while retaining a small number of cheap or even free places for Cambodians. This

would allow us to maintain the lead role we have taken in the development of services and would allow further post-graduate training, monitoring and evaluation.

The majority of students coming into CSPO is high school graduates or has some other third-level training. All require a competency in English. After much deliberation it was decided to teach in English and not Khmer, since this is the language of the regional economic grouping and so graduates in the future can maintain links with the international community of professionals. It must be recognized that improved language also increases the danger of students moving away from Cambodia or into other work. As we move more and more into regional training the need for a common language becomes stronger.

### **The Landmine Problem**

Without dwelling too long on the root of our problem, or should I say the impetus for our action, we must first place this fiendish invention in its proper perspective. The anti-personnel landmine or 'booby trap' is a commonly used low-cost device designed to maim, rather than kill, with the primary purpose of creating havoc in the ranks of young soldiers. It is a weapon of terror, creating a sense of fear and uncertainty of whether or not your next step might be the fateful one. It is designed to maim because the sight and sound of a seriously wounded but still conscious colleague is infinitely more morale sapping than the that of a cleanly killed one. The infrastructure needed to rescue, treat and transport the wounded far exceeds that of disposing of a corpse. The cost is low and the effectiveness so high, no wonder it is nicknamed "The sentry who never sleeps."

### **Disability in Low-Income Countries**

In mine-affected countries such as Cambodia, the vast majority of disabled people are young. Mine-victim amputees are virtually all in their twenties, with up to 70 percent of them being injured military personnel.

Cambodia has a young population. An adult life expectancy of lower than 50 years, and a high post-war birth rate makes the under-18 population more than 60 percent of the total. So the requirements for the performance of a prosthesis or orthosis is very different to that of the developed world. To begin with, the standard of amputation is often low, resulting in a stump with poor distal soft tissue or adherent scar, or with general poor skin cover. The nature of landmine injury is such that amputation is done in several stages. The initial damage to the limb may look relatively small but it is usual to find that actual sub-cutaneous damage extends much further than external inspection may indicate. The hot, high pressure gases associated with the blast will have inflated the limb prior to rupture of the skin so causing what might be described as a de-lamination type of injury not readily observable. Dirt and foreign materials will be driven with great force into the limb, so giving great concern for infection. So the normal method of treatment is the so called "open amputation" where the stump is left un-sutured for several weeks while daily de-bredment is carried out. Closing the stump before all foreign objects have been removed very seriously increases the risk of infection.

The procedure is not well suited to giving good results in myodesis, so resulting in poor distal end-cover. As a result the prosthetist is usually not able to fit a true total-contact prosthesis with any real degree of end bearing. This coupled with a young active amputee will make prosthetic fitting rather critical. It must be remembered that these disabled young people will receive little or no social service support, and may be cast out by society to fend for themselves. So prosthesis must fit and function well, the patient's ability to feed himself or his family may depend on it.

### **International Standards in Training of P&O Staff**

This problem has been haunting us at CSPO since the very beginning. Some agencies feel the criteria are too strict and are some sort of prosthetic/orthotic colonialism. Some feel that the time periods of training are too long and that prosthetists/orthotists should be trained in a matter of months. Some feel we are being forced to accept a first world standard that could not possibly be achieved in the Third

World. Some think the standards can only be achieved by organizations with multi-million dollar budgets. The above are not true, we have proved it.

The setting and achievement of international standards are always important. Standards are by definition, benchmarks; they are reality checks, mechanisms by which we assess our own progress, and especially by which we check our route map. The process of setting up education standards began in 1984 and has gone on right up to the present day. It has focussed the minds of those who educate as well as those who pay for education, giving clear direction to governments, non-governments and donors alike. I believe that the education standards set by the International School of Prosthetics and Orthotics (ISPO) are probably the most enduring legacy left by this body to the disabled of the developing world. How good it would be to see the same rigorous standards applied in the training of developed world practitioners.

### **Kick Starting Services to Disabled Persons.**

Using the very visible amputees as an initiator of services to other disabled people has become well established, as has the principal of having dual qualification in prosthetics and orthotics. The workshops, machinery and the other infrastructure around a prosthetic workshop are equally usable in orthotic production. The dual qualification is also dual applicable. This has been the role model in all the training schemes around the world. How strange it seems that in the west, we often work as either prosthetists or as orthotists. Up until recently, a rehab center working in both was also quite rare. In the developing world where resources are so scarce it is unthinkable to set up a dedicated service addressing just prosthetics needs.

### **Standing alone**

One of the biggest mistakes made in the early development of service to disabled people is ignoring the social and economic impact of the disability. In many societies the injured person is seen as an object of pity, leading to a beggar mentality. At worst they may become outcasts, as they are often seen as bad or unlucky people. The trauma of injury and then rejection creates a mental state, which often fulfills the expectation of the society, and the person effectively becomes a bad person. Having undergone trauma is often insult added to injury. Low expectations are also a problem. In the societies in which we often work, disabled people themselves expect not to work and expect to be cared for external to mainstream society. It is clear that services cannot be focused on prosthetics and orthotics alone but need to be broader. We are currently developing services in two areas:

- 1). Increasing the range of skills in the rehabilitation center by employing physical therapists, medical rehab doctors, social workers, psychologists and job referral agencies.
- 2). Changing the attitudes of society by the use of community based rehab workers. These people are very useful in patient selection and follow up but also have a massive role in empowering disabled people and in encouraging their families and communities to be inclusive.

### **Appropriate Prosthetic Technology.**

In 1995 the ISPO, with U.S. Agency for International Development funding, held a conference in Phnom Penh to look closely at the vexed question of appropriate prosthetic technology for the developing world. This discussion had raged for several years, with various agencies adopting wildly differing views on just how we could deal with the huge numbers of limbless in the world. I first became aware of the dispute in 1993 on arrival in Cambodia, having naively assumed that the P&O community would be one big happy family united by the cause. There were, at that time, seven agencies and it seemed almost as many different technologies in use.

### **Jaipur limb**

At the other end of the spectrum lay the Jaipur limb as favored by Veterans International. Not just favored but vigorously defended as the only appropriate technology in the world. The Jaipur Prosthesis is an exoskeletal aluminum device made by a technician who is trained as an artisan and not as a prosthetist. The foot is made from local rubber, quite cosmetic but heavy and rather solid. The biggest

problem lies in socket fit, which is made by eye and not to a cast. The open-ended design makes total contact or even lateral distal containment very difficult.

### **Wood and leather limb**

The other low technology group at that time were Handicap International, who were the fervent supporters of wood and leather technology. The prosthesis was heavy, unc cosmetic and the material was quite inappropriate in wet tropical conditions. The socket fit was dubious to begin with as the heavy leather made it difficult to make an intimate fit with the cast. The fit would then deteriorate further as the socket deformed in exactly the load bearing areas.

### **ICRC System With and Without Cosmesis**

The ICRC, American Red Cross and AFSC occupied the middle of the road. They were committed to rather nice, locally designed and manufactured modular system. Sockets were in polypropylene (PP) with mild steel componentry with some made in recycled injection molded PP. This system worked well, and was relatively easy to use. It was designed and built by a team of prosthetists and engineers working together. Over the past few years the system has been refined to make more use of recycled PP and less of steel, making a quite usable, low-cost device. It is now Cambodia's standard prosthesis, replacing the other options in each agency. Complete ranges of components are now in place, addressing all levels of amputation.

### **Selection of Feet**

Prosthetic feet remain a subject of tremendous debate. Naturally there has been considerable work carried out to try and build a foot locally, one that is durable, light and cheap. The importation of western feet has been inappropriate since the humidity, heat and the local flora and fauna lead to very rapid degradation of the material, so natural rubber remains the material of choice. There have been several designs of rubber feet, some using wooden keels, which are rather prone to rotting and some using polypropylene keels, which are rather prone to pulling out. As a prosthetist, the main difficulty with these feet is the lack of an effective heel cushion. The other problem is of course weight, with the device being probably twice that of a standard SACH. This must be placed in the context of a young active population and a price tag of around \$4. Much research continues to take place, with recent developments in keel material and shape. Recent innovations include a low profile foot for ankle disarticulation patients and attempts to design in some energy recovery. The low profile foot, because of its reduced material content, makes quite a difference to the weight problem.

### **Patient Safety**

The 1995 ISPO consensus conference pointed out that all technologies in use in the third world should be fully tested and safe. New technologies should never be tried out on the poor, simply because they are available and grateful for anything. They should not be field tested without proper safeguards for all. The consensus conference also noted that expensive solutions could also divert useful resources and so deprive other sectors with disability needs.

### **Who Pays and How**

It is normal in the world of international development that projects like ours have a life cycle. They have a beginning, middle and end. In rural development, the beginning is a need assessment where the communities' deficiencies are identified and a process of support planned. The middle part is the implementation of the plans, along with the donors' input. The third part is the evaluation. In this the objectives are re-examined, performance indicators applied and the project declared a success or failure. From the final reports, much is learned and the project is continued or repeated. This model is well established.

In emergency relief the needs assessment is usually foreshortened. In cases of famine, a few days are spent trying to establish the size of the problem and the amount of relief needed plus the logistics required to deliver the service. Money is raised, and the program swings into action. Lives are saved

and once the emergency is passed a very short evaluation is carried out so lessons learned in logistics can be transferred to the next emergency. This role model is well established and in place, and there are many expert organizations in the world who can execute such measures in a matter of days. It is sad but true, however, that emergencies happen quickly but are solved slowly, so often from emergency relief comes forth development programs. Refugees can rarely return home to wrecked countries without some sort of development assistance or infrastructure investment.

Prosthetics and orthotics should really fit into the former role model, especially in the scenario where education is involved. Indeed such was the case in Tanzania, Togo, and China when the German government, through GTZ, set up training schools for P&Os. These were relatively stable countries with well-established governments and infrastructure. We can say these schools have been highly successful. The planning stage was well executed, the government was a key player in this, and the graduates slotted neatly into a well-established system of health care. These schools have become unique role models of how development assistance can be well put to use. More recently new training schools have been established in El Salvador and Vietnam, both operating on the same model, as these countries have become stable after long periods of conflict. There is indeed considerable merit in waiting for a time until a country becomes stabilized before investing.

P&Os, however, have managed to slip out of the development camp and into emergency relief, mostly due to the considerable efforts of the ICRC. By their very nature, this body is charged by the international community to be on the front line in times of conflict. They are called upon to monitor the implementation of the Geneva Convention and aid the injured.

With advent of landmine warfare came unreasonably high levels of amputation, and ICRC surgeons now set the world's standards in traumatology. As a result they have moved very much into a leading role in the supply of prosthesis in conflict and immediate post-conflict situations. They have from that base moved into infrastructure development and P&O training. In effect they have had to move from emergency relief into development. As a result the ICRC has been involved in up to 16 countries working in P&O, and always in a development role with training components. So it can be seen just how easy it is to start a program and how difficult it is to get out.

In the conflict or immediate post-conflict situation, the difficulties are greater. Usually the governments are dysfunctional or are under severe stress. Infrastructure in general is reduced and other priorities overtake prosthetics and orthotics. In the last 10 years, even greater obstacles have emerged. Not only have some countries emerged from conflict but they have seen the collapse of the whole philosophy of government. Places like Cambodia, Laos, Mozambique and Angola have also to embrace capitalism as a new way of life. So in many cases we will be faced with a government fully committed to the role of provision, but unable to do so due to inexperience and the collapse of an economic system. These are unique times, with unique problems that need unique strategies.

It is easy for the western countries to say that governments should be responsible, and that new programs should hand over to governments, but when the system doesn't work, what can "new" do? The first question is "who is responsible?" In answering this we should be very careful to free our minds from the constraints placed upon them by our own experience. For those from the UK there is a natural tendency to try to create the beloved National Health Service. For Americans the tendency is to opt for private sector solutions. Who is right? Naturally the tendency in post-communist governments is to try to create a nationally run and controlled system. So what are the alternatives?

Over the past few years the debate has been taken forward in a number of forums, the most direct being the Henley Technical Workshops, a small brainstorming meeting looking at service in P&O. There role models around the world were discussed and the diversity was quite interesting. However at the end of the day some rather important things emerged. The role of government is to govern, the role of government as implementers is optional. At a time when the role of government in health care is under debate in the UK, France and the United States, it is important to realize that no magic bullet exists in the west either. So what is the future?

### **Planning and Development Toward Sustainability**

In 1995 we were seized by a great fear. Would the graduates of our little school be able to work in Cambodia in the immediate future and also in the long term? Considerable effort was being put into

training and it occurred to us it was likely that in 10 years time half of them might be employed as tour guides and the other half would be planting rice; a sobering thought. It was a sure bet that the government was not planning for long term and that most of the P&O initiatives were entirely NGO driven and supported, and NGOs are very short term. So a group of interested NGOs and government staff began a process of altering the thinking of so-called policymakers to the long-term needs of the rehab sector. To cut a long story short, we persuaded the government to set up a task force, which lasted for a year, and in that time we surveyed the country, looked at all the agencies associated with disability and began the process of National planning. Out of that has come a new body called the Disability Action Council (DAC). Since 1997, the future is at last being addressed. The DAC is a semi-government, semi-NGO group developing plans and defining problems, not just in P&O, but in reintegration of legislation, skill training, finance, the disabled and much more. It is made up of 43 agencies, large and small, along with the Ministry of Health, Ministry of Social Affairs and the Ministry of Education. Most important of all, the disabled people themselves participate as full and active members.

We are well aware of the problems, and we are well aware of the outside support, but we are also well aware of the shelf life this outside support has. How long will it be fashionable to support disabled in the Third World once the spotlight of the landmine issue grows dim?

### **So What Is the Point?**

In a place like Cambodia, the point is simple. Put people who should be working back to work. The numbers of disabled are disproportionately high and the resources disproportionately low. With the right infrastructure and assistance we can release the potential of tens of thousands of work-aged people to contribute to the development of their own country. The technical stuff is finished, the training also, the buildings are in place and the work begins. The biggest challenge is now being faced.

When will we achieve local ownership, local management and local funding? Who can tell? In the meantime having a locally based body that deals with the issues and maintaining development funding allows parallel development in the country. When I went to Cambodia, I was challenged to train Cambodians in P&O. Gradually the awful truth emerged that this was just a tiny part of the problem. The problems are not insurmountable, but they do present major challenges. It is pioneering work, and by its nature unpredictable. The objective is new and clear; the disabled are not to be helped, they are to be helped to help themselves.

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