AN ASSESSMENT OF WAR VICTIMS ACTIVITIES IN SIERRA LEONE

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January 10–14, 2000

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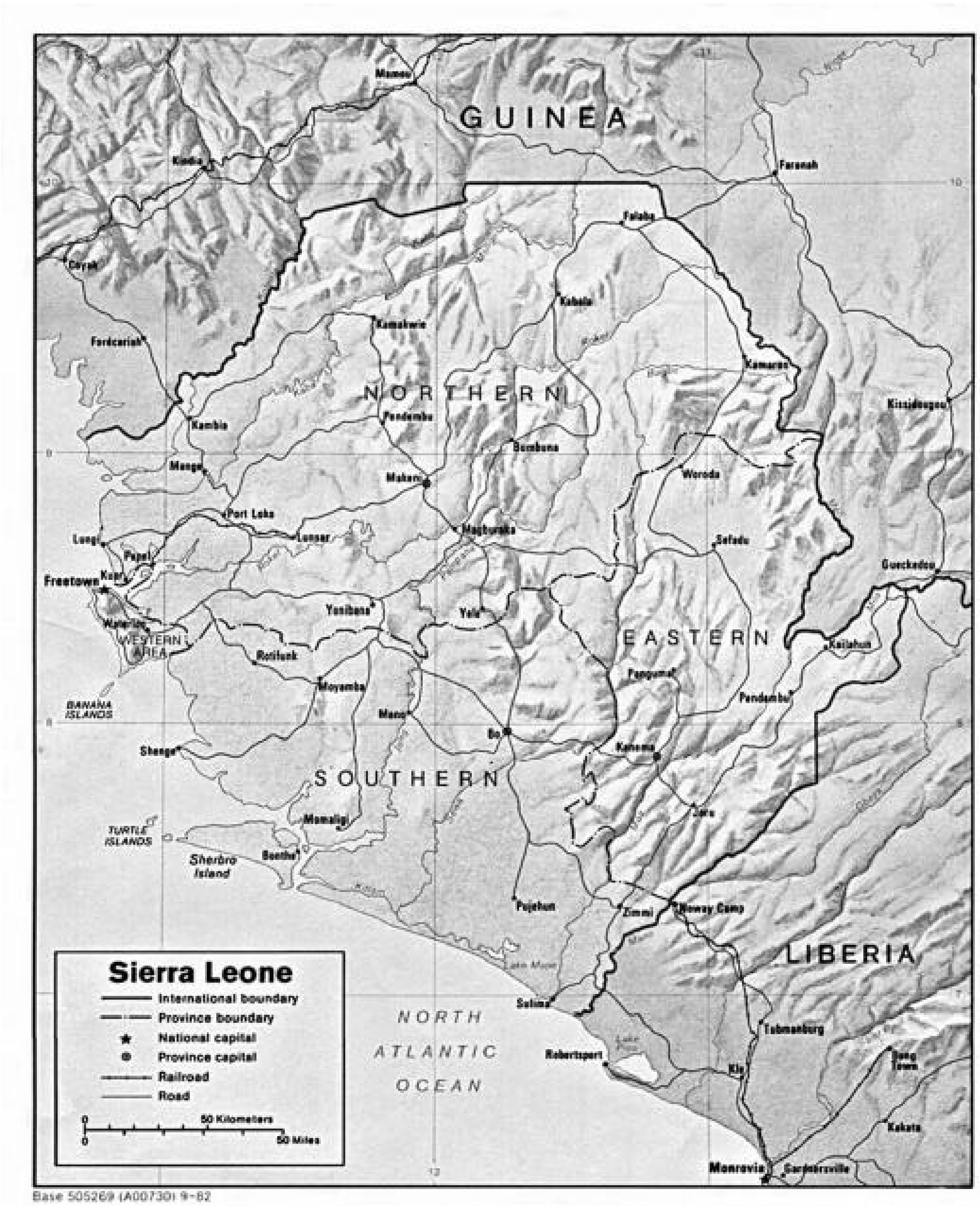
ACRONYMS

AFRC	Armed Forces Revolutionary Council
BHR	Bureau for Humanitarian Response
CAUSE/Canada	Christian Aid for Under-Assisted Societies Elsewhere
ECHO	Educational Concerns for Hunger Organization
HI	Handicap International
ICRC	International Committee of the Red Cross
IFRC	International Federation of Red Cross/Red Crescent Societies
IDP	internally displaced person
ILO	International Labor Organization
LWVF	Patrick J. Leahy War Victims Fund
MSF	Medecins Sans Frontieres
MSI	Mercy Ships International
NGO	nongovernmental organization
OFDA	Office of Foreign Disaster Assistance
OT	occupational therapy
POT	physical and occupational therapy
PVO	private voluntary organizations
RUF	Revolutionary United Front
TI	Office of Transition Initiatives
USAID	U.S. Agency for International Development
VI	Veterans International
WHI	World Hope International
WHO	World Health Organization
WFP	World Food Program
WRF	World Rehabilitation Fund


Sierra Leone
International boundary
Province boundary
National capital
Province capital
Railroad
Road
50 Kilometers
50 Miles
GUINEA
LIBERIA
NORTHERN
EASTERN
SOUTHERN
WESTERN AREA
NORTH ATLANTIC OCEAN
BANANA ISLANDS
TURTLE ISLANDS
Sherbro Island
Freetown
Monrovia
Base 505269 (A00730) 9-82

EXECUTIVE SUMMARY

Between January 10 – 14, 2000, a three-person team conducted a five-day assessment of war victims in Sierra Leone. The team consisted of Dr. Hugh Watts, a pediatric orthopedic surgeon, Mr. Mel Stills, a certified prosthetist/orthotist, and Lloyd Feinberg of the U.S. Agency for International Development, Global Bureau, Center for Population Health and Nutrition (USAID/G/PHN), the manager of the Leahy War Victims Fund (LWVF).

The purpose of the visit was to assess the current status of war victims, especially victims of "intentional, systematic mutilation," whose hands or arms had been amputated by members of outlaw army (the Armed Forces Revolutionary Council [AFRC]) or rebel (the Revolutionary United Front [RUF]) fighting groups.The assessment was the third visit under the auspices of the LWVF, but was the first that included technical specialists.

Due to the security concerns of the regional security officer in the U.S. Embassy, the assessment team was able to travel only within Freetown.

In addition, given the extraordinary volume of journalists, humanitarian assistance assessment teams, political leaders, and other visitors who have visited the amputee camp in Murraytown over the past few months, the team decided not to spend much time in the actual camp interviewing or examining amputees. However, on the final day of their visit, the team did visit the camp and meet with numerous recipients of prosthetic devices. This visit proved to be an extremely important element of the assessment.

INTRODUCTION

Between January 10 – 14, 2000, a three-person team conducted a five-day assessment of war victims in Sierra Leone. The team consisted of Dr. Hugh Watts, a pediatric orthopedic surgeon, Mr. Mel Stills, a certified prosthetist/orthotist, and Lloyd Feinberg of the U.S. Agency for International Development, Global Bureau, Center for Population Health and Nutrition (USAID/G/PHN), the manager of the Leahy War Victims Fund (LWVF).

The purpose of the visit was to assess the current status of war victims, especially victims of "intentional, systematic mutilation" whose hands or arms had been chopped off by members of outlaw army (the Armed Forces Revolutionary Council [AFRC]) or rebel (the Armed Forces Revolutionary Council [RUF]) fighting groups. The assessment was the third visit under the auspices of the LWVF, but was the first that included technical specialists. Five factors influenced the timing of the visit:

1. The team was initially established to conduct an assessment of the LWVF program in neighboring Liberia.

2. The plight of the victims of mutilation has received considerable public attention, most recently in a Sunday, January 9, 2000, cover story in the *Washington Post*.

3. A high degree of political attention has recently been focused on Sierra Leonean amputees, including a recent visit by Secretary Albright, and numerous public statements and funding commitments by President Clinton, the prime minister of Norway, and other world leaders.

4. An increasing number of private voluntary organizations (PVO) had expressed interest in and intentions to initiate programs targeting amputees, some of which duplicate existing services and others that are deemed to be technically and/or programatically inappropriate.

5. The LWVF had recently engaged on the issue of prosthetic and orthotic assistance in Sierra Leone through modest support of components and technical assistance, and is currently considering a significant intervention to be supported by the funding commitment made by President Clinton.

CONTEXT

Some sources believe that due to the conflict alone, Sierra Leone may have approximately 500 persons with upper-limb amputations, of whom 60–100 may be bilateral amputations. Furthermore, 2,000 people may need lower-limb prostheses. These numbers, however, only constitute a small portion of the number of people in Sierra Leone who may need orthopaedic devices. When counting all the people in the country who might need prosthetics and orthotics services, the total may be 20,000 or higher. Although the causes of disabilities may vary, the services these people need are the same. Therefore, the plight of amputee victims of mutilation in Sierra Leone must be approached from a perspective that encompasses a number of broader and interdependent concerns that include the following:

- Critical requirements of other victims of the armed conflict.
- Non-amputee, physically disabled, war wounded.
- Psychologically and socially affected war victims:
    - Unaccompanied and other children who are living without their parents.
    - Children suffering emotional or psychological consequences of the war.
    - Child abductees:
        - Former child soldiers.
        - Sexually abused boys and girls, “bush-wives,” child-mothers, etc.
- The overall population of people living with disabilities,[1] including those with other physical, sensory, emotional, psychological, and mental disorders.
- The overall context of a country that suffers from the lowest ranking of physical quality of life, including indicators shown in the following table.

[1]The number of people living with disabilities in Sierra Leone is impossible to calculate and extremely difficult to estimate under the circumstances of the past decade. Estimates range from 20,000–80,000.

Indicator	Rate Per Year
Crude birth rate	45 per 1,000
Crude death rate	22 per 1,000
Infant mortality rate	119 per 1,000 live births
Under-five mortality rate	145 per 1,000 live births
Maternal mortality rate	12 per 1,000 deliveries
Fertility rate	6.3 births per woman*

* Figure is per woman rather than per year.

The decision as to how to provide dedicated assistance for victims of mutilation within the context of the overall health of the population, also has to take other factors into consideration:

- **Equity:** How to ensure that reasonable levels of financial and human resources are allocated for particular sub-groups of severely affected individuals, when viewed within the context of an entire population that is in great need.

- **Short-term humanitarian assistance versus long-term development planning:** How to balance resources and ensure that short-term, dedicated, humanitarian assistance complements other post-conflict humanitarian and reconstruction requirements, and, where possible, might help mitigate the potential for further violence and chaos.

- **Quality control:** How to establish and ensure compliance with national standards for appropriate quality of services in both short- and long-term interventions.

- **Readiness:** Planning processes must include readiness of players to be able to capitalize on windows of opportunity to identify and serve new populations as they become accessible.

Current Status of Responses to the Needs of "Victims of Mutilation"

Human rights groups, Africa-watchers, and other special interest groups have long been aware of the tragic elements of the Sierra Leone conflict, and organizations such as the USAID Bureau for Humanitarian Response's Office of Foreign Disaster Assistance (BHR/OFDA), the Office of Transition Initiatives (BHR/TI), the Educational Concerns for Hunger Organization (ECHO), the World Food Program (WFP), UNICEF, and a small but dedicated community of international and local nongovernmental organizations (NGO) have been providing emergency relief and other humanitarian assistance for much of the past decade.

Within this response, primarily three organizations have provided assistance for victims of mutilation: Medecins Sans Frontieres (MSF) and the International Committee of the Red Cross (ICRC) for medical and surgical assistance, and Handicap International (HI) for psychological counseling, prosthetics, and physical therapy. In 1998, HI raised funding and mobilized a team to build on their earlier efforts to initiate a more comprehensive rehabilitation program that included prosthetic and orthotic services and expanded physical and occupational therapy (POT and OT).

In the meantime, in early 1998, as numbers of amputees emerged in Freetown (other areas of the country were either completely or virtually inaccessible) the government decided to establish a camp for amputees within an internally displaced persons (IDP)/refugee (Liberian) camp in Waterloo, about an hour from downtown Freetown. In December 1998, the amputees (and their families) were relocated to a new camp that continues to grow in Murraytown, within the city limits of Freetown.

In July 1998, the USAID/Leahy War Victims Fund conducted a brief assessment of the situation, followed by a slightly more extensive World Health Organization (WHO) assessment in August. At that time, approximately 200 amputees were living in Waterloo Camp, and both assessments estimated that probably another 500 amputees were living in and around Freetown outside of the camp, giving a total of approximately 1,000 amputee victims of mutilation, including refugees that might be from outside Sierra Leone.

As noted above, in December 1998, the Waterloo Camp was closed, and the amputees and their families moved to a new camp established in a field below the HI “Rehabilitation Center” in Murraytown.

At the time of the January 2000 assessment, the status of amputees and war wounded in Sierra Leone was as follows:

Number of Amputees by Location	
Location	**Number**
Murray Town Camp	168
Bo Area	94
Out-patients	67
Refugee Camps in Guinea	72
Registered with RUFP	41
Total	**442**

Upper- and Lower-Extremity Amputations

Position		Number
Upper Limb		258
	Unilateral	197
	Bilateral	52
	RUFP reported	9
Lower Limb		80
	Unilateral	79
	Bilateral	1
	RUFP reported	32

Prosthetic Delivery	
Type	**Number**
Functional Prosthesis	89
Cosmetic Prosthesis	48

Previous, Current, and Potential Assistance

With regard to amputees in Sierra Leone, and besides HI, which will be discussed later, MSF and the ICRC provided medical/surgical services in Freetown. MSF provided surgical assistance in Connaught Hospital, and maintains a small team there now. In 1998, ICRC upgraded the facility and equipped the private "Netlands" Hospital in Freetown and for a while provided surgical and other medical assistance. In 1999, it brought in a surgeon who performed approximately 20–25 operations known as "Krukenburg procedures." ICRC was forced to leave Sierra Leone for a short period but has returned and now provides a small-three person surgical team to a hospital in Kenema, which is able to do orthopedic procedures three mornings a week.

Over the last two years, besides HI, MSF, and ICRC, a few other NGOs expressed some interest in and/or initiated minor, short-term activities on behalf of amputees.

In 1998, an Indian NGO supported by the Choitran Foundation expressed its intention to establish a prosthetics and orthotics center in Lakka, and may have provided a few, pre-fabricated, "Mahaveer System" prostheses.

In September 1999, World Hope International (WHI) came in with its prefabricated, "Limbs of Hope" that were provided to 16 upper-limb amputees. Appendix A contains more information on this group and their unusual but technically interesting "variable socket design."

In November–December 1999, Veterans International (VI) seconded a prosthetist/orthotist to the HI workshop, and, with USAID/WVF funding, also provided some much-needed components and prosthetic feet to the workshop.

CAUSE/Canada (Christian Aid for Under-Assisted Societies Elsewhere) is planning to provide a physical therapist and possibly a prosthetist/orthotist to the HI workshop in February 2000.

The International Federation of Red Cross/Red Crescent Societies (IFRC) is currently initiating an effort in conjunction with the Sierra Leone Red Cross to assist amputees (and presumably other PLWDs) gain employment.

Also in December, the International Labor Organization (ILO) sent a mission to Sierra Leone to look at the issue of potential employment opportunities for people living with disabilities.

In 1999, Mercy Ships International (MSI), which had a ship-based prosthetics and orthotics workshop in Guinea, sent an assessment team to Sierra Leone. It is sending a subsequent team in late January to look at community development and psychosocial issues related to amputees, and in February will send a prosthetics and orthotics assessment team. MSI reports that the Ministry of Health has asked the organization to set up a prosthetics and orthotics workshop in Waterloo, but subsequent to the assessment mission, the organization was poised to establish a multipurpose prosthetic and rehabilitation center in eastern Freetown.

The World Rehabilitation Fund (WRF) was also planning to send an assessment team to Sierra Leone in February to look at a variety of war-related needs and potential interventions, including a possible income-generation program, again with a focus on people living with disabilities.

FINDINGS

Based on interviews with amputees; interviews with NGO expatriate and local staff and technicians, and representatives of a variety of international organizations; and extensive, on-site, hands-on/interactive observations by the team's consultant prosthetist/orthotist and orthopedic surgeon, the team concluded the following.

Barring the emergence of unanticipated and totally unexpected new populations of amputee survivors, the total number of "amputee victims of mutilation" (not including other, seriously affected war-wounded) in Sierra Leone is estimated not to exceed 600, possibly 1,000 at the absolute maximum. (However, it is estimated that Sierra Leone may have as many as 2,500 additional non-war-related amputees.)

At the time of the assessment, approximately 100 people had been fitted for prosthetic devices, although the team could not determine just how many of the amputees had actually received their limbs. These limbs included those produced by HI, and delivered by World Hope International. The team was also unable to determine how many devices other NGOs, such as the Choitran/Mahaveer group, provided, if any.

The team recommends that a qualified, technical team conduct a comprehensive assessment of people living with disabilities in Sierra Leone. Furthermore, the team recommends that on the basis of the assessment, a national plan for rehabilitation be developed to define long-term goals for providing prosthetics and orthotics services and to determine actions that need to be taken to achieve these goals. Such a plan would ensure that actions currently taken by local and international agencies and NGOs give lasting results. This plan should be developed by a working group on disabilities and rehabilitation comprised of appropriate representatives from the Government of Sierra Leone and implementing NGOs. Appropriate technical expertise should be made available to this group.

The team found that the amputees living in the Murraytown Amputee Camp have been politically exploited and have become discontent and dependent on a refugee-like camp existence. The team therefore recommends that the camp be closed down and that amputees be returned to more appropriate, community-based living arrangements. Children who are amputees themselves or are dependents of amputees in the camps should be returned to inclusive educational and social environments as quickly as possible.

The team has concerns about the usefulness and quality of upper-limb devices provided to date in Freetown. Unsubstantiated claims were made to the effect that few recipients of the HI limbs actually have their limbs and, of those, few appear to use them routinely.

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The two examples of the 16 "socketless" devices that WHI fitted in September 1999 appeared to be used and to be technically appropriate as an interim device. Although the means used by WHI

to identify, recruit, and publicize amputees was not considered appropriate for USAID/WVF funding, the team was impressed by the limbs and the apparent level of use and satisfaction as expressed by the wearers. Again, it is not yet clear how regularly the amputees actually use the limbs.

RECOMMENDATIONS

Although HI appears to have sufficient funding from sources other than USAID, the team recommends that USAID/LWVF be receptive to any request from HI for additional technical assistance that might improve the quality and usefulness of its services and devices.

The team recommends that WHO be supported and tasked with convening a two- to three-day meeting of all interested parties in the prosthetics and orthotics and rehabilitation sector in Sierra Leone. The purpose of this meeting is to present and discuss a draft of a comprehensive national strategy to develop prosthetics and orthotics services in Sierra Leone. This meeting should be hosted by the government and should include all implementing agencies, international donors, and any private donors intending to support activities on behalf of amputees in Sierra Leone.

The team recommends that LWVF funds reserved for Sierra Leone be used to support a program that meets the following criteria in terms of the nature of the assistance:

- Not limited to amputees;
- Not duplicating or overlapping ongoing activities;
- Supporting activities that address the broadest possible population of people who have suffered physically disabling wounds from the conflict;
- Not denied to other people living with disabilities similar to those suffered by victims of war;
- Supporting activities that might be sustainable after initial donor funding is finished; and
- Begining as quickly as possible, in Freetown, but designed within a strategy that would provide for expansion into heavily affected areas as they become accessible.

In light of the above criteria, and in consideration of a variety of concepts and proposals that have been discussed, the team recommends that the LWVF seriously consider an unsolicited proposal for support for a wheelchair assembly and distribution initiative in Sierra Leone.

APPENDICES

APPENDIX A - TECHNICAL ANALYSES

Following is a technical analysis of the rehabilitation services in Sierra Leone.

Dr. Watts and Mel Stills, certified orthotist, have a combined experience of more than 50 years in health care/rehabilitation services, both in the developed and the developing world. Dr. Watts, an orthopaedic surgeon whose primary interest is children's orthopaedics, and Mel Stills, trained initially in both prosthetics and orthotics, have a thorough understanding of the functional potential of those with orthopaedic disabilities. Although neither would proclaim to be technical experts on all aspects of rehabilitation medicine/prosthetics - orthotics or upper-extremity prosthetics in particular, both know the importance of a properly performed amputation, the methods used to fabricate a prosthesis/orthosis, the quality of fit necessary to ensure optimal function, and the importance of training patients in the use of their devices.

Background

No reports of new casualties or confirmed mine injuries are coming in. This report is referring to war-wounded as a result of past conflicts. The number of severe soft tissue injuries and infected, mal-, and non-union fractures is expected to be high, but the exact numbers are unknown. More complex injuries that would include spinal cord, head, chest, and abdominal injuries probably resulted in death because of the lack of immediate medical services.

The Scale of the Problem

Number of Amputees

Despite some reports in the media that Sierra Leone has 10,000 amputees, no data are available to substantiate this claim. Most respected and recognized NGOs, such as ICRC, HI, and MSF, estimate the number at closer to 600. The following tables show the number of registered amputees by location and by type as compiled by Handicap International.

Number of Amputees by Location	
Location	**Number**
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Bo Area	94
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Are there more amputees in the bush? Probably not, according to Dr. Mircedes Tanlary, director of medical services for the Medecins Sans Frontieres (MSF), based on MSF's experience treating the survivors of these amputations. Some have expressed the opinion that many died from the loss of blood following their mutilation, something again that Dr. Tanlary doubts, based on MSF's experience. Deaths from these horrific mutilations are reported, but many individuals were able to get at least primitive medical care. It has been more than one year since these atrocities were carried out, and most reliable sources believe the majority of the survivors have been accounted for. There may be a few others, but certainly not hundreds or thousands more hiding somewhere, as the press has reported.

Due to the conflict alone, Sierra Leone may have approximately 500 persons with upper-limb amputations, of whom 60–100 may be bilaterally amputated. Furthermore, as many as 2,000 people in the country may need lower-limb prostheses. These numbers, however, only constitute a minor part of all the people in the country who might need orthopaedic devices.

Because of the overestimation of the number of amputations in Sierra Leone, numerous NGOs have come to Sierra Leone offering services to the amputees, thus leading to competition rather than cooperation among some. There have been some reports of gifts, money, watches, and T-shirts being given to amputees to help create support for some NGO programs.

Types of Amputees

Sierra Leone's amputations are unique. In most countries, the ravages of war, traffic accidents, disease, and infection result in a preponderance of lower limb loss. This is especially so if land mines are a significant feature of the war. There is no indication that land mines have played a significant role in Sierra Leone. There are only three cases reported to be a result of mines. All three cases involved women.

Usually lower-extremity amputations comprise approximately 80–90 percent of the amputee population in a country. In Sierra Leone, however, upper-limb amputations comprise 70 percent of the amputee population. How many of these amputees are able to be fit with a standard prosthetic device is unknown. The level of upper-limb amputation is critical. The longer the residual limb, the better control that can be provided. The shorter the residual limb, the more difficult or complex the fitting becomes. Amputations at or near the elbow are certainly more difficult than the longer transradial (below elbow or BE). Amputations above the elbow (AE)—the new term is transhumeral—are much more complex in that independent control is needed for both the terminal device and the elbow. The higher the amputation, the more complex the solution. The higher the amputation, the less functional an outcome is expected. Amputations near the shoulder are much more complex and almost impossible to manage with anything more than a cosmetic-type device.

The science and art of prosthetics has mostly been developed for the lower limb. The upper limb presents a much more complex set of issues to be addressed. We do not use our feet for the fine, complex, motor skills required of our hands, nor do we rely on our feet for fine sensory

feedback. Consequently, when lower-extremity amputees are provided with appropriately designed and manufactured prostheses, they can quickly regain function and mobility. Even with the finest prosthesis available, upper-limb amputees do not have the sensation and fine motor skills needed to manipulate their fingers individually and therefore perform necessary daily activities.

Types of Prostheses

The two basic choices to make in selecting upper-extremity prosthetic design are namely a functional or a cosmetic prosthesis. The functional prosthesis consists of a socket and a cable system connected to a terminal device. In general, the functional prosthesis is heavier, more expensive, more difficult to fit, and requires that the amputee be trained to use the device to its maximum capacity. The socket must provide a total contact intimate fit for the amputee to have maximum control and for the device to be comfortable. The cable system must be properly attached and the harnessing properly adjusted so that all motion translates to terminal device control. Most terminal devices simply open and close. Objects are held between two posts but cannot be manipulated. They are simply held in one position through a spring, rubber bands, or pressure exerted through a cable. Many attempts have been made over the years to improve the function of these prostheses through better terminal devices and/or control cables. Cineplasties—tunnels made in muscle—have been done for better cable control, but have been rejected because of cosmesis and deterioration of the tunnel. Today, efforts are being made to provide sensation through electronics, but it is still experimental. Myoelectric control has improved the function of prosthesis but this technology cannot be supported in Sierra Leone at this time.

The cosmetic prosthesis is passive. It serves to mask the amputation and has no mechanical function. However, within the cultural context of Sierra Leone, where amputees are traditionally perceived to be “incomplete” human beings, many amputees desire cosmetic hands.

Upper-extremity amputees are many times disappointed by the prostheses they receive, both with regard to cosmetic and functional features. In Sierra Leone, this problem has been compounded by promises from would-be helpers, including the president of Sierra Leone, who have stated that the latest developments in prosthetics will make amputees normal again. This is a promise that is impossible to fulfill. Furthermore, the pledges by outside governments to provide large sums of money for amputees have been interpreted by the amputees as a promise that they will be able to divide the money among themselves.

The world experience is that many of the upper-extremity amputees reject any prosthesis that is provided. This is particularly so if the amputation is unilateral (one limb). Bilateral (loss of both limbs) amputees do present a difficult problem, since they are dependent on others for their daily activities. Children are so adaptable and agile that they quickly find ways to cope without a prosthesis, by using their feet as they would hands, for example. Worldwide experience is that less than 1 percent of children provided with one or more upper-extremity prostheses will continue to wear, let alone use, such prostheses.

Who should be considered for fitting with a prosthesis? The decision should be based on available resources. Should all upper-limb amputees be fitted? Even in the most industrially developed countries, there is debate as to whether all upper-extremity amputees should be fitted with a prosthesis. Health policy makers agree that unilateral upper-extremity amputees should be at the bottom of the priority list, especially in countries with limited resources. People with below-the-knee amputations (transtibial) are at the top of the priority list, since in most countries they comprise a majority of the amputees and are most likely to benefit from fitting.

Furthermore, in Western societies there is a relatively short window of opportunity for fitting the upper-extremity amputee. Generally, adults who sustain an upper-extremity amputation find it more difficult to manage successfully with a prosthesis if more than one or two months elapse between amputation and fitting. The majority of professionals the team checked with agreed that the window should remain open for six months, but after that period of time, the potential for success is unlikely. There are always exceptions, but most of the upper extremity amputees in Sierra Leone received their amputations more than one year ago.

Organizations Providing Services for Amputees

International Committee of the Red Cross (ICRC)

ICRC provides surgical support for the 90-bed Kenema Hospital through a surgical team of one surgeon, one anesthesiologist, and two nurses. Kenema Hospital has one ICRC-trained physical therapist. The hospital has a fee-for-service policy and ICRC is permitted to operate on those cases in which funds are not available.

Krukenberg Procedure

One and one-half years ago, ICRC began a program to encourage the use of the Krukenberg procedure, in which a functional limb is made by separating the ulna and radius and covering them with skin to create a pincer or claw. Advocates of the procedure point out the improved function, the absence of need for continuing prosthetic replacement and repair, and most importantly, retention of sensation. Midway through the program, strong vocal opposition to this procedure arose locally in Freetown from members of international NGOs who believed that patients were not informed of the results of such an operation, which opponents believe results in a limb that is unsightly and adds indignity to someone already mutilated. ICRC responded by discontinuing the program.

ICRC advised the team that 14 patients were operated, including 11 bilateral cases operated either unilaterally or bilaterally at one sitting. Five of the 14 sustained complications (sepsis, skin necrosis). Following the assessment, ICRC/Geneva shared the following statement:

> Far more important, however, is the fact that the program was rushed. Everyone concerned had underestimated the psychological element present in all these patients who had lost a limb through inquisitorial means. Handicap International believes that their beneficiaries need 9 to 12 months physiotherapy and psychological preparation beforehand.

Expatriates in Freetown believe all of the Krukenberg patients returned to the provinces, although no documentation of this exists. It is also believed that those patients are functioning well in their farming work but do not like the appearance of their limbs. One patient reportedly is even looking forward to having the operation reversed.

In conclusion, when safe travel into the provinces is permitted, a major contribution to the rehabilitation of those with upper-extremity losses can be made by conducting an impartial assessment of how these 14 patients have fared, especially when compared to the others who received prostheses. The Krukenberg procedure may be appropriate for some amputees in Sierra Leone. However, extreme care must be taken to ensure that each candidate for this procedure has proper counseling before the procedure is done so that he or she understands the nature of the procedure and its outcome and can therefore make an informed decision on whether the procedure is appropriate.

Cause Canada

Cause Canada is in the process of setting up in Freetown. Its primary goal is to conduct social reintegration programs. Its funding will cover children affected by war and vocational skills training. An occupational therapist and a social worker will also start work at the HI workshop in February 2000.

World Hope International/Limbs of Hope Project

The team visited WHI's office in Freetown and observed the registration of amputees that responded to a four-day radio campaign. WHI intends to fit these amputees with the "socketless prosthesis" developed by Dr. Chaz Holder.

The team saw a transfemoral amputee being measured. Three measurements were taken: one just proximal to the distal end, one higher on the thigh, and one length measurement from the distal end to the groin area. All measurements were taken with the patient sitting. A review of the log indicates that all patients have three measurements recorded, regardless of the amputation level. It is difficult to understand how three measurements can be translated to a functional prosthesis, particularly in the upper and lower limb.

WHI fit 16 transradial Holder prostheses: 14 in the Murray Camp and two outside. Only one was reported to not be wearing the prosthesis. The majority were reported to wear the limb two to four hours per day, but some evidently wear it more than eight hours per day. The prosthesis should have a life expectancy of 10–15 years.

The Holder prosthesis-socketless technology uses a metal frame contoured to the remaining forearm. A reaction pad is placed over the distal radius, and the device is secured with a circumferential Velcro strap. A terminal device is bolted distally; it cannot rotate as attached. A triceps cuff is used along with standard harnessing.

Limbs of Hope was planning to return in February 2000 and fit some 200 more amputees. It has also promised transhumeral and lower-limb prostheses.

Mercy Ships and the Barr Foundation are other organizations reported to be interested in being involved with the Limbs of Hope Holder-type prostheses. Dr. Holder's interest appears to be to get his prosthetic design used in Sierra Leone through whichever organization is willing to do so.

Limbs of Hope reportedly handed out watches, T-shirts, and possibly money during their September 1999 fittings of the Holder prostheses. Such gifts have added to the difficulty experienced by Handicap International and may add to the support of the project by amputees in the Murray Town Camp. Nevertheless, the transradial design has potential based on the team's observation of the device in use by two amputees in the Murray Town Camp. These observations are reported later in the section on the Murray Town Camp**.**

Conclusions Regarding the Holder Prosthesis

This system appears to be adaptable for mid-level to long transradial amputations. Literature indicates this style system is also available for transhumeral and lower-limb amputations. No patients in these areas were available for examination during the team's visit. The transradial design is not a totally new concept in prosthetics, but the socketless concept is difficult to envision for the other levels. The designer has indicated that lay personnel who have received limited prosthetic instruction can fit the system. Effective prosthetic management by those with limited training has never been demonstrated. All failures can be attributed to poor training.

The transradial design appears to be an excellent method of rapidly fitting amputees. In that capacity it can fulfill several roles:

- Help assess if the amputee will be a prosthetic user,

- Permit prosthetic activity while awaiting more definitive care,

- Use as a temporary device, and

- Avoid the time and expense of providing conventional prosthetics to the patient who will reject prosthetic use.

A trained prosthetist and therapist are required to make the judgement of proper fit, function, and outcomes to develop a treatment plan.

Medecins Sans Frontieres, France

Medecins Sans Frontieres (MSF) is primarily working in Connaught Hospital in Freetown, providing surgical services where needed. Due to the fee-for-service policy practiced by the local doctors, MSF must act in the same capacity as ICRC. MSF does not see its role as providing reconstuctive surgery, so it refers any patients needing those services to ICRC in Kenema. During the fighting, MSF was the primary source of technical expertise and surgical assistance at Connaught Hospital.

Adults and children at the Murray Town Camp who need surgery for their amputation stumps or reconstruction of war wounds are first seen by an MSF surgeon, who holds a clinic there once a week. By agreement with ICRC, those patients are put on a waiting list to be transported to the ICRC Hospital. Currently 21 people are on that waiting list. Apparently, the surgeon belonging to MSF had been relegated to doing minor surgeries on patients who are unable to pay for the services from a Sierra Leone surgeon.

Handicap International

Prosthetic delivery by Handicap International began in Sierra Leone in 1996 with the establishment of a workshop in Bo. Because of political unrest, the workshop was abandoned in January 1997 and re-established in Freetown in January 1998 adjacent to the Murray Town Camp.

The workshop has a 12-person staff. The workshop director was trained in Togo by GTZ. He is reported to have little clinical contact, and his job now appears primarily administrative. The Swiss-trained expatriate orthopaedic technologist arrived in April 1999. He has four years experience in prosthetics and orthotics but does not consider himself an expert in upper-extremity prosthetics.

Some of the technicians were trained in Makeni, Sierra Leone, by Brother Schneider. The three- to four-year training was primarily in shoe production for leprosy patients.

The workshop was poorly equipped. Both band saws, the shoe machine, and other pieces of equipment were broken. Proper hand tools and materials were in short supply. The workshop doing primarily orthotic production was also poorly equipped. Neither workshop had the tools and equipment necessary to properly provide the appropriate prosthetic and orthotic services needed.

Handicap International has had a philosophy of using locally available materials and basic low-tech prosthetic technology with the goal of obtaining a locally sustainable technology. Unilateral upper-limb amputees are a low priority for prosthetic management and only receive a cosmetic prosthesis if requested. None of the unilateral upper-limb amputees appeared to have received a

functional prosthesis. It is HI's policy not to fit upper-limb amputees, believing that the lack of a prosthesis would encourage the amputee to learn to function with his or her remaining hand.

HI had fit 50 metal and leather cosmetic prostheses. These prostheses had not been given to the amputees because they were still being trained on how to use them, although generally a cosmetic prostheses does not require any training in its use. All were lost when the facility was burned.

The orthopaedic technologist reported that HI stopped providing metal and leather prostheses when leather became unavailable on the local market. He had begun to provide plastic technology and had fit 30–35 prostheses. Another 20 or 21 have been provided since Veterans International (VI) became involved.

At the time the team visited, VI had just completed a six-week training course in upper-extremity prosthetic management for the staff of the HI workshop. VI plans to return for two more segments focusing on the lower extremity.

The orthopaedic technologist estimates that all remaining upper-limb amputees will be fit in the next six months: a reported 52 bilateral amputees or a potential 104 prostheses. If the numbers provided (30–35 and 20–21) represent patients who received prosthetic services, then all of the patients have been fit. If the numbers represent limbs fabricated, then about one-half of the patients have been fit. It is difficult to find out what the numbers really represent.

The orthopaedic technologist stated that

> the amputees say that they use their prostheses, but I have not seen this. They want mostly the cosmetic prosthesis. The goal is to empty the camp. Upper-limb prostheses in the future will be provided to those who ask for them.

He also stated that he has been asked to turn over most of the production of upper-limb prostheses to local staff and provide more of a supervisory role.

Upper-Extremity Prosthetic Design

The functional upper-extremity prosthetic design observed in the HI workshop was fabricated with a polypropylene socket, an Otto Bock terminal device, and standard prosthetic harnessing. The northwestern ring and sliding buckles had been fabricated using polypropylene sheet material. All the prostheses the team saw both on patients and in fabrication used a supracondylar type socket.

The team observed one bilateral transradial amputee in the process of being fit with his prostheses. His amputation length was three to four inches proximal to the wrist joint. Both sockets were of the supracondylar design. The technician was adjusting the harness and

identifying cable attachment points. The sockets looked too big, with at least a three-quarter-inch gap at the proximal edge, and they were cylindrical, not conforming to the residual limb.

Because of the long length of this person's stumps, a prosthetic socket design that permitted more supination and pronation would have increased control and functional potential. The supracondylar design is best used on a short amputation where suspension of the system is difficult. The design severely limits active supination, pronation, and extension of the forearm.

Examination of the sockets after removal demonstrated a rough proximal edge due to the stockinet's pulling in during thermoforming. It is difficult for the technicians to make surfaces smooth because they do not have the proper tools.

The team observed two patients being cast for transradial prostheses during our visits. Both were of the supracondylar design. Both patients have stump lengths that would not require this design. Plaster models were created and large buildups added over both condyles and the olecranon. Further buildup was added to provide clearance at the proximal edge. Check sockets were used to check fit prior to fabrication. Proper fit of the prosthetic socket is critical if the prostheses is to work.

Two cosmetic prostheses were in production. Plastic sockets and rigid hands were used. The prostheses were painted to match skin tones as much as possible.

The length of time between casting and delivery of the completed prosthesis is generally two weeks. All the amputees the team saw had mature stumps, although we saw some people in the camp with Ace bandages or dressings. One person was in the process of wrapping her stump, but her arm appeared to be well-healed.

Lower-Limb Prosthesis

We saw a transtibial amputee in the workshop being refit with a polypropylene socket and liner. The socket was being mounted on a wooden pylon with metal straps and rivets. An HI-designed wooden foot was used. This method does not permit the dynamic alignment changes necessary for comfortable gait. The socket fit appeared appropriate. The amputee was able to walk and appeared stable with crutches. His amputation was secondary to a gunshot wound that also injured his contralateral limb.

During the team's visit, there was an eight- to nine-year-old girl at the center with bilateral transfemoral amputations due to a motor pedestrian accident. She was going to be fit with standing legs and quad sockets. We witnessed the thermoforming of these sockets. The vacuum system was not set up correctly, and it was a real struggle for the technicians to form the plastic. So much time was used that the polypropylene had cooled too much to be formed correctly to the model. Then the technician began to cut the socket out before the plastic had properly cooled. Normally the plastic should cool completely, generally over night, but they said that the girl was

there for trial fitting that day. These sockets appear too big for such a little girl, but the team was assured that they would fit just fine because they had tried a check socket before.

The team also saw one eight- to nine-year-old girl with a unilateral transfemoral amputation that had been fit with an exoskeletal system. This amputation was reported as secondary to a motor pedestrian accident. The girl walked slowly but appeared stable without walking aids. We were told that she was receiving gait training. Later that day we saw her without her prosthesis. The therapist keeps the prosthesis until the patient clears training.

The team saw only one transtibial modification. A very large buildup had been added along the tibial crest. The patellar bar was very deep and straight across. It is difficult to believe that a socket made from this model would fit properly or be comfortable.

Custom Footwear/Orthotics

The team did not see any footwear in production, but custom shoe lasts were being made and several were in the workshop. The quality of these shoe lasts indicated that those who produced them had been given good training. The team did not see the leather patterns one normally sees in shoe production, perhaps indicating that the proper leather was not available. Little equipment is available for this activity.

The “orthopaedic workshop” is about 100 yards from the prosthetic workshop. The workshop provides lower-limb orthotic services, primarily to polio cases. Two technicians work in this area. It is unclear where the senior person received training, but he is providing on-the-job training for an assistant. Both workers were polio victims themselves and wore KAFO’s.

The workshop is poorly equipped, having one set of bending irons; one grinder; an oven, which does not work; and a drill press. The workshop provides metal and leather orthoses having a molded leather foot section for insertion into the shoe. The workshop uses the slipper and stirrup design because proper shoes are not available. Part of the insole is made from cardboard because sole leather is not available. What leather the workshop has comes from France. At one time, shoes were provided to the patients, but this became too costly, and now patients are asked to provide their shoes. They use prefabricated KAFO brace components purchased from Europe.

The two technicians working in this area appear to work independently, and the team did not observe any outside supervision. The two technicians produce 25 KAFO’s per month. When the team visited, there were17 KAFO’s in production and nine tracings that had not been started. The two technicians state that they are no more than five behind in production and that production takes from one to two weeks. None of the orthoses are for small children.

Two KAFO’s were in fabrication. The technician worked quickly but did not use any alignment tools. The joint surfaces were not squared. Binding was reduced by oiling the joint. The uprights followed the tracing closely.

One patient was in the process of being fit with a new KAFO. The orthosis was widely contoured to his limb, but there were no excessive pressure areas. The patient was able to ambulate without assistance. The knee and ankle joints had not been squared, and this will cause early breakage and/or binding when sitting. This patient also asked for money to buy new shoes.

One other patient was in for leather repairs, and the technicians made the repairs quickly.

Wheelchairs are not available for the nonambulatory patients. Wheelchair production is not available in the region.

Murray Town Camp

In the Murray Town Camp in Western Freetown, 168 war-related amputees have been clustered in a separate area. This camp also houses 210–300 war wounded with problems such as tendon lacerations and non-union of fractures. Such lacerations, due to machete cuts, leave people unable to use their hands, requiring reconstructive surgery, re-education, and rehabilitation. These war wounded live in the camp with their families so that the total population of the camp now is approximately 2,000. The camp is maintained by HI, but MSF provides administration and family medical care. Reconstructive surgery is referred to ICRC.

The camp has been criticized by many that believe that it encourages the amputees to become dependent, which certainly seems to have happened already. Proponents state that many of the amputees are not able to return to their homes until all hostilities are definitely ended. Some have impugned other motives for the camp's retention: that the presence of the camp, with amputees readily available to be seen by visiting dignitaries, helps keep the pressure on donor governments and NGOs to remember the plight of the Sierra Leoneans.

The amputee village at Murray Town has been accused of fostering dependence by not providing what prostheses HI has completed for patients, but has only allowed patients access to the limbs for training. The amputees complained of the lack of meaningful or job-related tasks included in their training in prosthetic function.

A concerted effort has not been made to find jobs for the amputees as a part of their rehabilitation. The local Coca-Cola bottling plant has employed six upper-extremity amputees in Freetown. At least three of them work as security guards.

Two patients in the camp are using the Holder-type prosthesis. One is a bilateral long transradial amputee who was fit during Limbs of Hope's September visit. He is a very enthusiastic wearer of the prosthesis and believes all the amputees in the camp should receive this prosthesis over anything provided by Handicap International. He was able to control the terminal devices throughout a wide range of positions: overhead, in front, out to the side, etc. He could sit on the ground and lift himself up by pushing down with the terminal devices. He demonstrated above normal strength in both upper limbs and did not appear uncomfortable when resistance was applied. However, one of the harness straps was cut halfway through from the Bowdon cable,

demonstrating heavy use and harnessing problems. Furthermore, the fit of the prostheses are cause for concern: The distal pad over the radius did not conform well and the triceps cuff has only distal contact. The terminal device does not rotate and limits function. The patient could not put the device on or take it off without help. Examination of the limbs did not demonstrate excessive pressure areas.

The other person wearing the Holder device was a unilateral long transradial amputee, who demonstrated the same degree of control and strength. The quality of fit was the same as that for the bilateral patient. This patient demonstrated the effective use of a prosthesis by a unilateral amputee. His limbs did not demonstrate excessive pressures.

Limbs of Hope are proposing to establish yet another camp in the eastern part of Freetown to house those not adequately cared for in Murray Town. Establishing another camp would compound existing problems rather than solving them, and therefore should be discouraged.

Conclusions

The number of amputees requiring prosthetic services would not be overwhelming if properly trained staff and a properly equipped facility were available. Most of the amputations are at a level that is not technically demanding for properly trained and experienced prosthetists. More equipment and materials were arriving when the team visited, and the Handicap International program director stated that another prosthetist was due in from Canada in February.

It would appear that the Handicap International workshop has not effectively managed the upper-limb amputee population to date, and comments from a number of amputees suggested that the prostheses provided are not being used. No successful fitting was observed.

It is evidently HI's philosophy not to fit unilateral upper-extremity amputees with prostheses, and there is no indication that any of the 197 unilateral upper-limb amputees have been given a functional prosthesis. Veterans International recently completed a six-week training program in upper-extremity prosthetics. The staff's ability to fit upper-extremity prostheses may have improved as a result of the training; however, the current design selection and fit of such prostheses indicates that the instruction should be repeated before the staff moves to the next level of training.

Eventhough bilateral upper-extremity amputation patients have been given the highest priority for fitting, some have not received treatment to date.

The quality of prosthetic socket fit needs to be dramatically improved. The socket design needs only to be modified so that the longer levels are permitted better forearm rotation and function. The needs of the short transradial and the transhumeral levels have yet to be addressed.

Because of the media attention given the Murray Town Camp, every effort should be made to ensure that all amputees have at least been given the opportunity to be fit and trained to use an appropriate prostheses. If one patient is denied appropriate care and another group comes in and successfully manages that patient, all the services provided may become suspect.

Handicap International's effort to fit upper-extremity patients at the Murray Town camp has had very limited success. Additional assistance and supervision is urgently required in order to improve this situation.

Recommendations for Rehabilitation Services in Sierra Leone

1. Upper limb prosthetic training should be repeated before any other training is provided.

2. Additional training should be provided in all areas of prosthetics/orthotics.

3. Appropriate candidates should be identified to send to TATCOT for Category II training in prosthetics and orthotics.

4. An appropriate individual should be identified to receive Category I training in prosthetics and orthotics.

5. Production facilities should be properly equipped.

6. If USAID/LWVF funds are to be used to directly provide prosthetics and orthotics services, LWVF must be assured that the services are of an appropriate quality and that the patients receive proper training.

7. If USAID/LWVF is to assume any responsibility for amputee care in Sierra Leone, LWVF's response must be rapid and fully supported.

8. USAID/LWVF should not support the establishment of additional prosthetics and orthotics facilities outside Freetown. The amputee numbers are not high enough to warrant diluting the available resources.

9. Outcome studies should be established to assess the effectiveness of any projects undertaken.

10. If projects are funded, an exit strategy must be part of the plan.

11. The possibility of establishing wheelchair production facilities should be explored in the same area of P & O production to maximize resources.

12. Every transradial amputee who desires a prosthesis should be given the opportunity to try one; Holder devices may be used as temporary devices.

13. All prostheses/orthoses provided through funding received from USAID/LWVF must be of appropriate design and fit.

14. All patients should be assured of receiving physical/occupational therapy when indicated.

15. A national action plan should be developed, priorities should be set, and donors and service providers should be organized.

16. Those who receive prosthetics and orthotics services must also receive the necessary job training so that they can return to their community and meaningful lives.

APPENDIX B - CONTACTS

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Terrance Tanzer

APPENDIX C - MEETINGS

January 10–14, 2000

January 10	10:00	Security Briefing American Embassy
	1:00	UNICEF
	3:00	ICRC Mission Director
January 11	8:00	Embassy
	11:30	Handicap International
January 12	8:30	UNICEF
	9:00	UNICEF Lungi
	1:00	World Hope International
	4:00	Medecins Sans Frontieres France
January 13	9:00	Handicap International
January 14	8:00	Deputy Director of Mission Breakfast
	1:00	Ambassador Briefing
	2:00	Cause Canada
	2:30	Murray Town Camp
	3:30	Depart Sierra Leone