Prosthetic Services in Algeria

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For about two years the Swedish Red Cross in Algeria, North Africa, has maintained a prosthetics project. The goals of this project are:

1. Construction of below and above-knee prostheses
2. Training of local personnel
3. Development of local industry

I should like to explain these three points in more detail because I realize that these and other questions will be discussed whenever it becomes necessary to start a similar project in a developing country.

According to different government offices, there are between four and eight thousand leg amputees living in Algeria today. Only several hundred of them have been provided with prostheses. It must be mentioned here that even today amputations have to be performed monthly. The reasons for these amputations are explosions of land mines. Several areas of the country are still covered with an unknown number of plastic mines which are extremely difficult to discover and defuse. It is the intention of the Swedish Red Cross to supply as many amputees as possible in the eastern provinces of Algeria with prostheses. For this purpose the Algerian Government has made shop facilities available. The Center of the Swedish project is in Constantine, an old but beautifully located city approximately 1900 feet above sea level, and 65 miles south of the North African Mediterranean seacoast.

The Swedish Red Cross has supplied the shop facilities with modern tools and machinery, at their own expense. Also, it employs presently, in addition to the Algerian apprentices, the following personnel: a shop supervisor, three orthopedic technicians, and a secretary. In addition to the prosthetics center, the hospital has made facilities available for an ambulation training center and inpatient care for our amputees. An orthopedic physician, a physical therapist, and a nurse are working in this part of the hospital. All are Swedish citizens. Altogether, this project involves eight Swedish employees.

The procedure is as follows. The Algerian Red Half-Moon, which is their equivalent of the Red Cross, has the task of registering leg amputees in outlying districts and transporting between 10 and 20 of these amputees to Constantine, whenever so requested. This is not always an easy process. Illiteracy is a widespread problem. The patients have to be sought out in the different mountain villages, because postal facilities and addresses are not available. The patients are transported to the hospital and then examined by

the orthopedic physician. After casts and measurements are taken, the prostheses are constructed. Whenever necessary, stumps are revised. The average stay of a patient is two to three weeks. During this time, the legs are fitted and the amputee receives daily ambulation training and physical therapy. In this manner, between 20 and 35 patients are provided with prostheses and discharged.

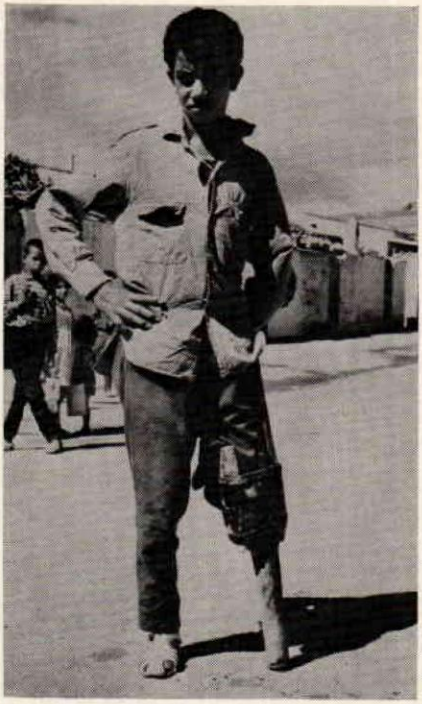
The training of local personnel consists primarily of practical training in the shop. Several hours during the week are reserved for didactic teaching in anatomy, physiology, and hygiene. During my six-month stay as shop supervisor in Constantine, I had the opportunity to concern myself primarily with the technical training program. We recruited our trainees directly from a type of vocational school for mechanics, and obtained excellent results. At present there are four to six trainees employed in the shop. It is the primary goal of the project to enable the Algerians to run the prosthetics center on their own. During the time of training, the Swedish Red Cross assumes all expenses with the exception of the salaries of Algerian apprentices. These are paid by the Algerian Red Half-Moon. It is the present intention to gradually withdraw the Swedish personnel and eventually to turn over the project completely to Algerian hands.

It is essential that great stress be placed on the availability of materials. The currency conditions in Algeria are such that funds for the procurement of material in foreign countries cannot be obtained. It is necessary that European component parts, which can only be bought with foreign money—in this case, Swedish currency—must be replaced with Algerian materials that can be obtained within the country. These materials need to be up-graded eventually. This procedure, followed strictly, will be the best way towards self-help. It is hoped that, in the near future, the pressure from those who have been provided with prostheses will be utilized to prod the Government along these lines.

One cannot overlook the fact that in any of these under-developed countries there is a great deal of unemployment. The leg amputee, even if he is provided with the best prosthesis, will have difficulties in finding gainful employment if he is not able to take care of himself in his own agricultural environment. The State, as such, does not have a great interest in absorbing this group of disabled people in the economy. Algeria is not an industrial country.

However, we have found a number of raw materials and, by the use of these, we have come closer to the goal of independence from imports. For example: after considerable effort I was able to contact an international service organization (C.C.S.A.) whose goal it is to combat the progressive erosion of the soil on a large scale. Millions of small cedar seedlings are being planted in the bare and eroded areas of the Orest Mountains on the northern border of the Sahara. At the same time, cedar trees from two to three hundred years old, which have been damaged by Napalm bombs, are being cut down. This cedar wood has proved to be well suited for the construction of prostheses. Although it is 8% heavier than the generally used poplar or linden, the cedar wood is rather dense and has long fibers, thereby providing greater strength and increased elasticity.

It is not my intention to impress upon the readers that it is possible to conduct modern prosthetic services, using cedar wood, badly-tanned sheep and cow hides, and iron—so long as one has the will and energy. On the other hand, modern prosthetics does not have to be equated with plastics and other synthetic materials. Modern prosthetics also consists of certain fun-



The most prevalent type of prosthesis, model "homemade." This boy inherited his prosthesis several years ago from an older amputee. One can notice the flexed knee position. The amputee practically walks on his knee. It is surprising, however, that we rarely see fixed-knee contractures despite the fact that the patients in many cases have been walking on their knees for several years.

damentals which determine the indication for specific prostheses, the alignment, etc., in addition to materials. Considering all of this, we quite often see a type of half-modern prosthetics service which, in every case, is certainly better than no prosthetics service at all.

I would also like to discuss the area where one can use various types of prostheses. It is a generally accepted fact that in all countries of the world prostheses are constructed by following standard principles. Except for individual stump differences and also for financial considerations, these are always the same.

1. Under what conditions will the prosthesis be used? For example, for heavy manual labor, or for sedentary pursuits?

2. Under what external conditions will the prosthesis be used? For instance, what is the terrain? What are the climatic conditions? What are the possibilities for easy repair and adjustment?

In Algeria these questions can be answered when one realizes that:

(1) Sedentary employment exists only to a very limited degree;

(2) the amputees will live in most instances in small mountain villages without any road connections or, where roads do exist, they are in very bad condition.

(3) the median temperature is high.

(4) possibilities for repair of prostheses do exist but, for most patients, they cannot be obtained because a trip to Constantine is a very complicated and—for Algerian conditions—expensive undertaking.

For one who has for the past five years been following the development of the PTB prosthesis, as well as having actively worked on this, I could not fail to notice definite disadvantages in addition to the great and unquestioned advantages. Experienced European, as well as American, technicians have stated that follow-up examinations have revealed a fairly high percentage of amputees for whom PTB prostheses were definitely not the proper prosthetic type. Sweden and the United States, from a prosthetic point of view, are certainly sophisticated countries. It has been found that maintenance problems are higher and that the life expectancy of the PTB is lower than of conventional prostheses. It is also a fact that a badly worn shoe can create alignment problems within a PTB socket. This occurs to a higher degree than with conventional below-knee prostheses.

The vast majority of our Algerian patients walk on extremely poor shoes. Under existing climatic conditions, perspiration is a serious factor. Pressure and abrasions are more frequent where temperatures are above normal. We have found that these pressure and abrasion complaints can be minimized considerably when the PTB prostheses are converted to conventional limbs. I am not in a position to prove these points. However, I have had some experience in this field, and I had excellent opportunities during my time in Algeria to re-examine patients who had been fitted with PTB prostheses at an earlier time. In many cases, results of these re-examinations were depressing. I have come to the conclusion that the plastic closed-end PTB prosthesis is not indicated for most patients in Algeria.

For the above-knee prostheses, I feel that the patient who has gotten around for several years with a more or less homemade pylon is an extremely difficult candidate for modern prosthetic services. Many such cases have been complete failures. The explanation seems to be simple. The "civilized" experts just do not have in their armamentarium any place for observation of people living in really primitive conditions. These people

Soccer playing in the yard of the Hospital is part of the daily routine, and is a favorite gymnastic exercise.

depend upon the land for their living. They have to spend all of their lives on rocky, mountainous terrain, as shepherds. They have only the most primitive housing. Amputees depend upon their prostheses to a degree of which we just cannot possibly have any comprehension.

I had an opportunity to study several dozen of these homemade prostheses, and I would describe them as follows: strong wooden peg up to the knee, where it is divided and runs on a lateral aspect of the stump for about four inches past the hip joint. At this point there is a belt, a strap, or something similar which runs around the waist. By this means the prosthesis is suspended. Between the medial and the lateral fork one finds parts of a firmer leather socket which was either riveted, screwed, or bolted in, being open at the end. The whole is padded with pieces of cloth, old socks, and other textiles. The wooden fork may be broken in several areas and carefully reassembled by means of nails, screws, or wire. The general impression is that the peglegs are always too short, the gait is not aesthetic, the prostheses are unhygenic—but, no pressure sores, because the whole socket is soft; no complaints about heat because the air circulates about the stump freely; fairly rapid and uncomplicated ambulation, not only on level ground, but also up and down hill; maintenance problems minimum, and if some breakage occurs, the problem can usually be taken care of by the patient himself. The legs, as a rule, are extremely cheap and dependable. In other words, this is the almost-ideal prosthesis for this specific type patient. "Our" prostheses, in most cases (this concerns above-knee prostheses) give definitely inferior service. The foot was always a handicap. A SACH foot was out of the picture. The socket was too warm, and too hard.

What is one to do? Solutions can undoubtedly be found. Perhaps the "good old leather socket"—perhaps an exchangeable foot, which could then convert the pylon to a Sunday-and-holiday leg. There are many possibilities, but one has to spend some time to arrive at a good solution.

I would say that language difficulties don't exist at all—unless one is just lazy enough to pretend that they do. One can understand Arabic just as easily as German or English when a patient explains that his prosthesis is either too heavy or too warm, or too hard or too long, or whatever the problem might be.

Above all, one has to learn that, for example, in Algeria one does not automatically construct European or American prostheses, but primarily, Algerian ones. Once this fact is accepted, the greatest part of the problem has been solved.