

**Site Visit to the
Tanzanian Training Center
for Orthopedic Technologists
January 1998**

of behalf of the Leahy War Victims Fund

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EXECUTIVE SUMMARY

On behalf of the Leahy War Victims Fund (LWVF), the team of Don Cummings, CP and Catherine Savino, MPH, traveled to Moshi, Tanzania from January 8-16, 1998 to visit the Tanzanian Training Center for Orthopedic Technologists (TATCOT). TATCOT, an International Society for Prosthetics and Orthotics (ISPO) recognized school for prosthetics and orthotics, submitted a proposal for funding on September 1997. The proposal described several areas where assistance was requested, including support for the training of qualified students who lack sponsorship. The team evaluated the merits of the proposal, assessed the technical offerings of the school and made recommendations to the LWVF manager for further action.

The team conducted both individual and group interviews, reviewed materials and conducted site visits. Weather conditions and time constraints did not allow for off site visits to any of the workshops TATCOT uses for training.

The overall assessment was very positive. Both the technical and managerial skills, as described in the technical overview section of this report, support these findings. Additionally, TATCOT offers advantages to the LWVF beyond the funding of a specific proposal. For example, the fund is interested in pursuing a prosthetic foot initiative, to find (or develop) a foot that is more durable and affordable. TATCOT is newly involved in component production. The TATCOT foot is being developed as an affordable alternative to Otto Bock and other models. The information that TATCOT is collecting about this development is useful to the fund initiative. In terms of a long term strategy, TATCOT offers new possibilities for use as a testing facility, as well as a practical laboratory for research and development.

One of the LWVF's strategic objectives is to strengthen the capacity of organizations to become sustainable. Graduates of TATCOT add to the available pool of trained technicians as ISPO-certified level II orthopedic technologists. By supporting TATCOT, the Fund increases skilled professionals for Africa in general and for LWVF-supported countries in Africa in particular.

RECOMMENDATION ONE: That the Leahy War Victims Fund provide support to TATCOT with a special emphasis on supporting training of students from WVF-supported countries.

BACKGROUND

The Tanzanian Training Center for Orthopedic Technologists (TATCOT) was founded with the support of the Federal Republic of Germany in June of 1981. WHO, UNDP, GTZ and others serve on their advisory board. The Center enrolls students from English-speaking African countries as well as other interested countries. It is the only ISPO recognized prosthetic-orthotic training center in Africa. .

TATCOT submitted an unsolicited proposal to the Leahy War Victims Fund in September 1997. That proposal was the basis for discussions with TATCOT aimed at identifying the areas or activities that could best strengthen the school. The team found the proposal to be a comprehensive appraisal of the school's needs. The outline of the proposal described the diploma courses and entry requirements, the short term training needs, consultant activities, aimed at raising the school's profile, and a description of the school's management. There were many other stated needs as well.

USAID policy follows certain funding conventions. Grants may be awarded to nongovernment organizations (NGO's) that are registered as such with USAID. Similarly, international organizations are able to receive grants but they too must be on an officially recognized list maintained by the Department of State. As a parastatal organization, TATCOT is ineligible to receive USAID funds directly from the Leahy War Victims Fund. Part of this assignment included investigating funding options in the event that all other criteria for LWVF support were met.

PARAMETERS FOR USE OF THE LEAHY WAR VICTIMS FUND

Keeping the LWVF strategic objective in mind (see Appendix) as well as allowing TATCOT latitude in management, the team devised the following TATCOT-specific guidance in funding activities: Activities that meet LWVF criteria would include:

- ▶ sponsorship of students for both the 3 year and 1 year programs including travel to LWVF-sponsored countries to review applications
- ▶ equipment (limited and specified)
- ▶ library materials (limited and specified)
- ▶ follow-up meetings of past graduates (e.g. short courses).

Activities that fall outside the LWVF mandate would be

- ▶ continuing education courses for teachers (unless this includes a local short course for past graduates as described above).
- ▶ allied health services e.g. Occupational Therapy and Physical Therapy
- ▶ technical and clinical services.

In addition, the team recommends that there be a stated preference for applicants coming from LWVF-supported programs in Africa (currently, Liberia, Angola, Mozambique). There should also be a preference given for qualified applicants who are women and/or disabled.

RECOMMENDATION TWO: That TATCOT consider the aforementioned guidance in revising their initial proposal for the Leahy War Victims Fund.

TECHNICAL OVERVIEW

The site visit included a tour of the TATCOT program and facilities, and several of its clinical and educational affiliates such as the K.C.M.C. Hospital, orthopedic workshop, component research and development area, PT and OT Schools and clinical areas. Members of the faculty (See Persons Contacted in Appendix) were interviewed both as a group and individually.

In general, the TATCOT program appears to be very well managed, clean, orderly, and professional. Here, education appears to be a serious business. Machinery, tools and equipment are meticulously cared for and organized. It is in many ways exemplary of how an orthopedic technology program should be run, and is representative of the quality educational programs established by GTZ. This opinion is substantiated by others who have visited the center recently, as well as by its ISPO recognition.

The curriculum of the three-year orthopedic technology course as well as the one year courses in either prosthetics or orthotics are well-described in the TATCOT flyers in the appendix. In general, graduates of the three-year course are trained according to classic German Orthopedic Technology methods, but much of their course material also includes information from references used in training programs in the United States.

Appropriately, since these graduates will return to practices in the developing world, students' education in the 3-year program begins with basics such as woodworking, metallurgy, machine-shop skills, anatomy and physiology. They first learn to actually make components such as single-axis wood knees, SACH feet, etc., and are able to mill their own orthotic joints and other components if necessary. Such skills, perhaps no longer essential in the developed world, enable these students to be considerably less dependent upon manufactured products than their Western counterparts. Although they are trained in the use of "modern" materials such as polypropylene and modular lightweight metal componentry, they are also capable, for example, of identifying appropriate wood for use in fabrication of wood sockets. They could, if that was all that was available, select the wood, treat and dry it appropriately, glue it together, and carve and fit a quadrilateral wood socket. They could also use plaster casting methods and measurements to fit and fabricate

a modular transfemoral prosthesis with either a polypropylene or laminated socket according to appropriate biomechanical principles.

Students who matriculate through either of the one-year courses have slightly lower educational requirements for admission, but are generally expected to be more experienced in the prosthetic or orthotic field before they are accepted into the program. Their course includes just as much emphasis on the practical, but focuses upon only one discipline. Again, this curriculum is well-described in the flyer included in the Appendix.

Both the 3-year course and the one-year courses include regular attendance at the KCMC weekly orthopedic clinic. This interdisciplinary clinic is run by an orthopedic surgeon, and is attended by the prosthetic-orthotic students, TATCOT clinical prosthetists and orthotists, PT and OT. The students are actively involved in the prescription, provision of orthotic and prosthetic services and follow-up. The Kilimanjaro Christian Medical Centre is a general referral hospital with over 400 beds, serving approximately 6 million people in northern Tanzania. It is also a national teaching center for medical, nursing, and allied health professionals, making it an ideal location for an educational program like TATCOT.

The screening and admission process at TATCOT appear thorough and appropriate. Requirements for 3-year and 1-year students are included in the Appendix. In general, students must be recommended by their own government and financially sponsored. Mr. Mtallo, who is in charge of this effort, explained that once students have met the educational requirements for the program, they are given an entrance exam as well. He expressed concern that at times more qualified or experienced students may never receive an opportunity to attend TATCOT, because they lack the political and/or financial support. Once enrolled, students are evaluated quarterly. This coincides with collection of tuition, and builds in accountability for the sponsor, the student, and TATCOT.

The TATCOT program offers different training options such as :

- ▶ a 3 year diploma course in Orthopedic Technology (both orthotics and prosthetics) leading to ISPO category II status (DOT)
- ▶ a 1 year certificate course in Lower Limb Prosthetics Technology
- ▶ A 1 year certificate course in Lower Limb Orthotics
- ▶ Other short term programs of up to six months in specific areas (i.e. orthopedic shoes technology, spinal biomechanics, courses in upper and/or lower limb Orthopedic Technology applications, management of orthopedic labs and PO upgrade training course.

In addition to education, the center had led research into the use of locally available materials for the production of components used in orthotics and prosthetics. In 1990, a local component production unit was started. The Center coordinates practical internships throughout the Africa and cooperates with many other training institutions such as CNAO

(Lome/Togo), PETCOT (Peshwar/Pakistan), BUFA (Dortmund, Germany) Heidelberg Prosthetic/Orthotic School (Germany), National Center for Training and Education in Prosthetics and Orthotics, University of Strathclyde (Glasgow, Scotland) Prosthetic Orthotic School (Jonkoping, Sweden).

Major sponsoring organizations of TATCOT to date are:

**Ministry of Health
German Foundation for International Development (GSE)
Gesellschaft fuer Technische Zusammenarbeit (GTZ)
British Council and Commonwealth Secretariat
United Nations Development Programme (UNDP)
Associazione Italiano Amici-Di-RaoulFollero (AIFO)**

MANAGEMENT OVERVIEW

TATCOT is under the Directorate of the Department of Training and Manpower of the Ministry of Health (See organization chart in Appendix). Mr. Harold Shangali serves as the Principal. His qualifications and leadership skills contribute greatly to TATCOT's success. Though there is good support and able guidance given to the school from KCMC and TATCOT's Advisory Board, it is unclear who would succeed Mr. Shangali in the event he should leave. Though he has no plans to do so, if his position was vacated, there would need to be a review of TATCOT's management capabilities. At this point, Mr. Shangali is key to the organization.

TATCOT forms part of the Kilimanjaro Christian Medical Center (KCMC), which is the consultant hospital for the Northern Zone of Tanzania. The academic supervision of the course is carried out by the University of Dar es Salaam, and a diploma is awarded to graduates of the three-year course.

The school is under the oversight of the management committee which meets once a week. The Committee has the authority to manage, supervise and coordinate all school activities as decided by the Board. It is also responsible for all issues related to finance, training, staff and student affairs. The system promotes a high degree of transparency in its management style. The Advisory Board meets once a year .

Regarding the larger question of how TATCOT might be funded given USAID parameters, the World Health Organization emerged as a likely choice. Dr. Dirk Warning, the WHO Representative for Tanzania, met with the team and offered assistance. WHO spoke highly of TATCOT and since they serve on their Advisory Board, they knew their work and strongly supported USAID support. As an international organization, WHO has experience and unique qualifications within Tanzania to work closely with TATCOT. Dr. Warning and his Deputy, Dr. Mohamed Amri were very helpful in connecting the team

with WHO/Geneva finance office. In Geneva, Mr. Atuke, WHO Budget and Finance Office for AFRO, provided procedural tips and examples of similar grants. Pertinent information was conveyed to USAID/Dar and USAID/Washington.

QUESTIONS AND ANSWERS WITHIN THE SCOPE OF WORK

Q.What is the current capacity of the TATCOT program? How many students can be trained annually?

A. 15 in the 3-yr program and 10 in the 1-year program

Q.How many students can the hostel accommodate?

A. Up to 45 students can be accommodated

Q.Are equipment, facilities, materials and personnel adequate for current levels of training?

A. Yes, but some machinery may need replacing or repair. Also, the library needs updated texts and reference materials, and a video camera could benefit the clinical as well as the educational activities.

Q.What would be required to increase the capacity of the program?

A. The capacity cannot be increased without additional staff. Otherwise, improvements such as additions to the orthotic-prosthetic library, repair and replacement of some machinery, computers with modems for Internet access, etc. are appropriate and will enhance current activities greatly.

Q.What is the geographic distribution of current graduates of the program?

A. See Appendix. It is interesting to note that there are several Liberian candidates who lack financial sponsorship, and otherwise, countries where WVF projects are located are very under represented both by applicants and graduates.

Q.What would be required to train non-English speaking students?

A. Students would need to learn English as a prerequisite to entering. Local tutors are available for assistance and “brushing up”.

Q.What is the current level of support from various donors/sponsors? What is the relationship with ICRC?

A. One TATCOT instructor (Mr. Elias) attended the ICRC 3 month training program in Addis Ababa, Ethiopia in 1995. Subsequently, he was provided with the complete system for manufacturing the ICRC polypropylene component system, including knees, ankles,

cosmetic covers, polypropylene “leaf-spring” (for lack of a better term), feet, etc. Mr. Elias began introducing this system, but shortly thereafter decided to pursue a career in the military, and left. Since then, reportedly, only a few of the ICRC components have been utilized. Mr. Mosha reports he has seen several systems fitted through the orthopedic workshop at TATCOT, and he is tracking their progress. (Three patient charts were provided, and sufficient information should be available to determine the outcome with these components should they return later for follow-up

In November of 1997, Rainer Knoll, an ICRC representative visited the TATCOT program to follow up on the training received by Mr. Elias, and to discuss progress with the ICRC system. Mr. Shangali explained that since the only ICRC-trained prosthetist was no longer employed at TATCOT, little progress had been made either in using the system clinically, nor in introducing it through the educational program to students. Apparently, it is ICRC's hope that their system will be used both in the clinic and as part of students' education. Following the meeting with Mr. Knoll, Mr. Shangali has proposed that perhaps three faculty members should attend the ICRC course in Ethiopia. This would ensure adequate back-up should one of the faculty members move on (as before), and would enable the TATCOT program to better evaluate the appropriateness of the system. To date, there has not been a response by ICRC to this proposal.

Q. In light of the needs in countries such as Liberia and Angola, what is the capacity for TATCOT to provide upgrade training?

A. The one-year training option in either Orthotics or Prosthetics seems to be the best option. The educational requirements for entry are slightly less for this level, and the material is geared toward the student with practical experience who is perhaps lacking in theory and basics.

Q. How does the TATCOT school address the needs of landmine victims and of prosthetists and orthotists working with victims of war? Are particular forms of technology preferred and emphasized over others? Is the use of thermoplastics (i.e. polypropylene) part of the curriculum?

A. Land mine victims are evaluated and treated as any other trauma patient would be. Some limited information regarding the mechanism of injury by land mines and possibility of further infection, etc. is provided by guest-lecturers in surgical technique. The use of polypropylene is taught as part of the curriculum, but is less emphasized than techniques involving resin-based technology. Students are given exposure to major forms of technology including wood, resin-based technology, thermoplastics, and modular componentry in prosthetics. The current emphasis is upon exoskeletal prostheses with acrylic laminated finishes. In orthotics, the emphasis is upon conventional metal and leather systems, but polypropylene is introduced.

Q. Does TATCOT provide training in the design and production of prosthetic feet and other components? What kind of prosthetic foot does TATCOT recommend for use in

Africa? Is a distinction made between urban and rural demands placed upon components?

A. During our visit, Mr. Mosha, an instructor who is aTATCOT graduate, (also trained in Germany), described in detail his efforts to develop local manufacture of components for use in Tanzanian orthopedic workshops. He would like to reduce the dependency upon components manufactured in Germany, and realizes that it is very time-consuming to fabricate one's own components on a small scale. Of particular interest is a SACH foot which he has been producing locally using rubber acquired from a local tire company. This is essentially a duplicate of a SACH foot with a 2 cm heel-rise, so it is really intended for use with shoes in a more urban environment. The rubber coating is basically flat-black after the vulcanization process, so the foot is arguably less cosmetically pleasing than a foot pigmented to match one's skin color. The toes are not sculpted. What is most impressive about the effort is that it is being carried out with methodical attention to detail so that it can eventually be produced commercially with reasonable control of quality. Again, the intent of this effort was to stimulate local, more affordable production, not to develop a new foot design. Mr. Mosha reports this foot can be sold at a profit for about \$28 U.S., whereas the same foot from Germany costs at least \$80. This foot is in limited production, and a follow-up study is reportedly in its early stages.

TATCOT has also had limited experience in evaluating a relatively new foot designed by ICRC. The foot is fabricated with a series of 4 polypropylene plates, each slightly shorter than the other, stacked upon each other in pyramid fashion. This system articulates with either an ICRC polypropylene ankle or a metal pylon system. The internal "foot", is then covered with an outer hollow cosmetic shell of lightweight polyethylene foam. To date, only a few of these feet have been fit at TATCOT, and no statistics are yet available regarding durability or patient satisfaction. Other components in local production include an orthotic ankle joint, an orthotic drop-lock knee joint, and a wood, single-axis prosthetic knee joint.

It is quite possible that the TATCOT program would be an appropriate site for some collaboration regarding the development of an improved foot for the developing world. Not only are the conditions and usage patterns similar to most of the developing world, but the level of training of the faculty is high, as is their interest in local, affordable production. Mr. Shangali expressed interest in this effort, particularly in early collaboration on the development of a follow-up tool to track acceptance and durability of the feet produced at TATCOT. He also indicated TATCOT might be a good site for clinical testing of feet from other centers, or of any prototypes resulting from efforts. These discussions were encouraging, and further communication on this topic is recommended.

APPENDIX

Persons Contacted

Agency for International Development, Dar es Salaam,

- Mr. James Dempsey, Deputy Director
- Dr. Janis Timberlake, Technical Advisor,

Kilimanjaro Christian Medical Center, PO Box 3010, Moshi Tanzania Tel 25-55-54377, ext 123

- Professor John Shao- Director, KCMC
- Ms. H. Grossman - Occupational Therapist
- Ms. Bertha Mworira- Director of Pysiotherapy

TATCOT, PO Box 8690, Moshi Tanzania; Tel 25-55-53986-7; Fax 25-55-52038

- Mr. Harold Shangali - Principal
- Mr. Amolo Hongo - Vice Principal of Administration
- Mr. Emmanuel Mchomba - teacher
- Mr. Linda Mtui - school accountant
- Mr. Martin Kibaha - senior staff Member
- Mr. Paul Scunda - teacher
- Mr. Longhini Mtalo - Academic Officer
- Mr. Emmanuel Mosha - teacher
- Ms. Hortensia Maliya - tutor
- Mr. Mayal a- Head of Orthopedic Department, KCMC
- Mr. Abdul Ukwaji - librarian
- Mr. Steven Ingi Mayo - tutor

World Health Organization, Luthuli Road, PO Box 9292, Dar es Salaam, Tel 255-51-111718, Fax 255-51-113180

- Dr. Dirk Warning - Representative for Tanzania
- Dr. Mohamed Amri - Disease Prevention and Control Officer

World Health Organization, 20 Avenue Appia, Geneva, Switzerland Tel 791-4630 fax 791-3994

- Mr. Atuke - Budget and Finance Officer for AFRO

International Committee for the Red Cross, PO Box 5701, Addis Ababa, Ethiopia, Tel 756240

- Mr. Joe Ubiedo - Technical Coordinator, Special Fund for the Disabled