Evaluation Report of the East Asia Regional Rehabilitation and Prosthetics Project Vietnam

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&

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1. (Former) ICRC Project, Saigon

Activity:

We met with the Center's Director, visited the facility and interviewed technicians.

Observations:

The Rehabilitation Center at Ho Chi Minh City was established in the 1950's, although the prosthetic center was fully established around 1989-1990 by the ICRC. The center reportedly has 12 trained prosthetic technicians, provides prosthetic services using the ICRC polypropylene technology, and also provides some conventional orthotic services. The volume of work at the center has declined from a reported 110 prostheses per month to about 20 per month. This volume decrease is due to the lack of external financial and managerial support. The director stated that to run at capacity (110 prostheses/month), the center would need about $15,000 per month. Based on the figures provided by the director, these 110 prostheses would cost $136 each. ICRC reports the cost of their prostheses to be approximately $50 per month. It is unclear where the discrepancy lies.

Overall, the facility has considerable space and machinery that was not being used anywhere near to capacity. Many of the lathes, saws, etc., looked to be covered with dust, seldom used, and in need of general maintenance. In one room, about 20 bags of polypropylene scraps had been stored and were awaiting processing.

The majority of patients are veterans, those who fought for the North and whose health care is managed by the government. The center's director reports that government support for anyone other than a veteran is reportedly very limited, but that they also treat a few private patients who are able to pay for their own prosthesis.

Physical therapy for persons receiving prostheses at the center is provided by the Physical Therapy School on site. Apparently coordination is complicated because the Rehabilitation Center and Prosthetic service are governed by MOLISA, while the Physical Therapy School is governed by the Ministry of Health. Nevertheless, a clinic including a doctor, physical therapist and prosthetic technician is reported to meet on Tuesday, Thursday, and Saturday mornings for both evaluations and follow-up. It is interesting to note the Director was unaware or, at least, did not acknowledge the presence of the HVO PT training occurring in the building above the ICRC fitting area.

One KAFO tracing lay rectified and waiting for the technician to contour metal joints and bands. Although the ankle joint center had been drawn incorrectly through the center of the malleoli, rather than at the distal tip of the medial malleolus, and both malleoli had been drawn at the same height, the tracing otherwise reflected a conventional approach.

We saw several individuals wearing prostheses, but no actual fittings were in progress. Prostheses in progress were primarily for transfemoral patients. These seemed to be produced using the accepted sequence of casting, modifying, bench alignment, dynamic alignment (with polypropylene modular components), followed by transfer and finishing. The technician we interviewed understood basic principles of static and dynamic alignment. Several AK sockets we examined were representative of quadrilateral design, but edges were very rough and sharp. Many of the sockets we saw had rivet heads protruding on the inside of the socket.

When asked about durability of polypropylene devices, the director indicated most lasted about 1 - 3 years, but prosthetic feet need replacement much more frequently. The feet being used consisted of a SACH foot design with reinforced latex soles and a wooden keel. The center is now switching to feet with a polypropylene keel which they feel is more durable. Mr. Stills notes that during his last visit two years ago, the center was in the process of implementing the polypropylene keel. This keel has been introduced in Cambodia and is now a standard part of normal foot production.

Summary:

This center appears to have excellent, albeit declining, facilities, machinery and staff well-trained in the ICRC technique. But, without funding and some infusion of continuing prosthetic and managerial guidance, only veterans and patients who can pay will receive service and the quality of that service will most likely continue to decline. Little or no follow-up data is being collected to determine quality and durability of services.

Recommendations:

< We suggest this center be included in MOLISA's national plan for orthotic and prosthetic care in Vietnam, that any upgrade training provided through GTZ, and the Vietcot program should include staff from this center.

< Although the prosthetic orthotic service is ideally located in a rehabilitation center which includes a physical therapy training program, cooperation between the two services is apparently limited by the fact they fall under different ministries. Any external funding for this center should include a requirement for a cooperative effort between the physical therapy program and the prosthetic-orthotic program.

2. Health Volunteers Overseas (HVO) Physical Therapy Training Course

Activity:

The HVO sponsored Physical Therapy Update Course (scheduled for May 6-10 and 13-17) was observed in progress at the national rehabilitation Center in Ho Chi Minh City. These courses are the final trials of a physical therapy update curriculum which HVO pilot-tested during 1995. The courses scheduled in May and July included Vietnamese instructors from each of the three schools in Vietnam. The curriculum includes a detailed physical therapy manual/reference written in both Vietnamese and English. A copy of the manual was provided.

Observations:

The curriculum is intended to upgrade the skills and knowledge of individuals who are currently practicing physical therapy in Vietnam. Students were selected by the Ministry of Health with preference given to provincial physical therapists since they have generally not had as many educational opportunities as therapists in urban centers. (One PT from the Can Tho center attended the course we observed). The staff stated that those students attending would become resources for future training, but would gain no financial or recognized elevation in standing by having participated. In order to focus on fundamental skills with wide application, the course begins with treatment of stroke patients and fracture patients, then includes further training modules such as prosthetic gait training.

Graduates of the program do not have to pass an exam, but are simply reviewed by the instructors.

Summary:

This course is distinguished by several qualities. First of all, it is based on a comprehensive needs assessment, followed by substantial advance preparation and research. Second, it focuses on functional outcome rather than method. Finally, it is written in both English and Vietnamese (opposite each other), so that Vietnamese therapists learning English have an easy reference and are better prepared for future relationships with international institutions. The curriculum and the reference manual should have a lasting impact as the instructors continue upgrading the skills of more and more therapists. This model could serve as a good model of curriculum development and ongoing evaluation for other NGO's to emulate.

Recommendations:

< The course should incorporate both an entrance and exit examination to monitor content mastery and to ensure continuity over time.

< We recommend the educational model for this course be applied to training physicians and therapists in prescription and check-out of prostheses and orthoses.

3. Vietnam Assistance for the Handicapped (VNAH)

Summary (Thu Duc and Can Tho):

Major improvements in facility management and prosthetic services were noted at both Thu Duc and Can Tho centers. Nevertheless, the project could be improved significantly by a needs-based plan for upgrading technical skills and greater emphasis upon quality and functional outcomes rather than numbers of prostheses produced.

Activity (Thu Duc):

During our visit, we met briefly with the project supervisor, toured the facility, and observed several prosthetic fittings. Unlike past visits, deliveries are no longer dependent upon Mr. Ca Van Tran's presence, so patients seen during our visit reflect an ongoing flow of service. Overall, the facility is much more organized, clean, and orderly than on previous visits and prosthetic design and fabrication have improved. During our visit, the technical director in Thu Duc received recognition by the Vietnamese Red Cross for services to amputees.

Observations (Thu Duc):

Technically, prostheses for transtibial amputees show visible improvement over previous visits, when it was noted that sockets were very rough and non-anatomical. On this visit, sockets were smooth inside, trimlines were less sharp, and transtibial prostheses appeared contoured in appropriate anatomical locations. Above-knee prostheses were still fabricated from measurements and either carved from wood blocks or, when possible, made by modifications to an existing positive mold. All prostheses are exoskeletal in design.

Though a trial fitting may occur at the center, most prostheses, and particularly those done for outreach projects, are fabricated after "bench" alignment only. (This was not always to commonly accepted biomechanical standards. For example, AK sockets were often aligned without initial flexion.) Sockets are glued with a resin paste into wood blocks and then bench-aligned upon wood knee joints and/or ankle blocks over a Can Tho-made SACH foot. In order to make an alignment change, components must be broken apart, shifted or wedged, and reattached. There was no demonstrated evidence that any of the prostheses had undergone any modifications or changes in alignment.

When asked, technicians are aware of how to make such dynamic alignment changes. This practice was not observed, however, and our impression is that unless initial alignment is grossly incorrect, time and shear numbers of prostheses being produced would seem to supersede the labor-intensive effort required to make appropriate changes. (This impression has been substantiated by observations from previous consultant course instructors Todd Anderson, Jim Hughes, and Gary Berke). This will probably not change unless quality and functional outcomes

are valued over production numbers. Even should this emphasis shift, the lack of adjustable components or alignment fixtures means that technicians would need to be both patient and tenacious.

Alignment fixtures can be purchased through Hosmer Dorrance or Southern Prosthetics Supply in the United States. Otto Bock in Germany has some components that would work just as well. The importance of alignment can only be emphasized through training. Both Gary Berke and Jim Hughes have been to this project and provided training that included dynamic alignment using the adjustable leg. Alignment will be used as a standard only when a quality final product is part of the goal of service at this center. This ultimately is the responsibility of the project director to emphasize and require.

Several patients were receiving new prostheses during our visit. One above-knee prosthesis was being delivered and appeared adequately aligned. One technician, however, delivered a new transtibial prosthesis and fit the patient with a thin, one or two-ply sock when clearly the socket was much larger than the patient's limb and could easily have accommodated ten or fifteen plys. The patellar-tendon "bar" was overly prominent and the medial to lateral width of the socket was more than a centimeter too wide. In general, prosthetic design and fabrication has improved but there does not appear to have been as great a carry-over from educational efforts as anticipated. Perhaps the continued emphasis upon production numbers rather than functional outcomes, results in a disincentive for technicians to fabricate better-fitting prostheses.

Although educational activity was planned in the project accomplishment outline, training efforts during the past quarter were limited to the Chiang Mai training course and a cerebral palsy course provided by a volunteer Canadian professional, Sharon Carr (we are unclear whether she was an orthotist or a therapist). She came to know of VNAH via the Internet and taught a course on treatment of CP patients. The subject area was determined in conjunction with the Center's director. No curriculum or course outline was available. The training is noteworthy only because there is no record of what was taught, nor what the benefits were.

Two of the technicians from the project were sent to the recent Chiang Mai prosthetic training course. (No curriculum was available). When asked, aside from general positive statements regarding the experience, they could identify no specific benefits.

Activity (Can Tho):

During our visit, most of the prosthetic-orthotic staff was already en-route to the outreach effort in Kien Giang, 3 hours drive south of Can Tho. We observed 5 patients, not amputees, receiving physical therapy. Several of the patients appeared to be post-polio, one had a brachial plexus injury, another an elbow trauma, and one patient had just had a quadriceps release from a contracture reportedly caused by an injection. After this brief visit, we traveled to Kien Giang in order to observe an outreach project the following morning.

Observations (Can Tho):

Physical facilities at Can Tho were well-organized, clean, and orderly compared to previous visits. A 3-ton donation of DOW epoxy resin had been received and stored out in a covered area. We are concerned that the shelf-life of this supply may be limited by the hot conditions, but will need to request a Material Safety Data Sheet from DOW Chemical in order to be sure. We will send this information on to VNAH. It should also be noted that technicians were storing working quantities of the resin in an open bucket with a flat cover laid over it. Beside it was a shelf covered with globules of resin used for mixing of pigment. We noted that the lamination room was inadequately ventilated by either natural or mechanical means. During the few minutes we visited the room, both Mr. Stills and I experienced eye irritation.

Prostheses observed in various stages of fabrication were similar in design and fabrication quality to those observed in Thu Duc.

Outreach Project (VNAH):

The MOLISA Director in Kieng Giang Reported that 800 unserved amputees had been identified in the province. Also, 103 veterans had already received prostheses from the Can Tho Center. She also reported 2,000 victims of polio, ranging in ages from 1-16, in the Kieng Giang catchment area. An immunization program in the area began in 1992.

Approximately 73 patients, including amputees and post-polio victims, actually registered on the first day of the outreach, but 300 were anticipated during the three-day project. Twenty wheelchairs were also scheduled for delivery during the outreach. Outreach patients had been identified by the Vietnamese Red Cross and notified via word-of-mouth, radio, television, and newspapers.

Patients registered by providing their name and government identification card. The chief prosthetist examined the patients first. He performed a very basic, focused physical exam and referred clients on for casting. He apparently based decisions mainly on the quality of amputation, the condition of current prosthesis, and basic information such as strength and range of motion. Those patients who required medical or surgical intervention were referred on to the. physician. During the outreach, no amputee patients were noted who did not at least have a prosthesis, albeit well-used and self-repaired.

Once referred for casting, cast technicians casted the patients. Their anatomical markings reflected knowledge of important anatomy (i.e. patella, crest of tibia), but did not reflect the patient's actual anatomy. For example, tibial crest markings were simply a straight line down the front of the limb and did not follow the actual bony crest. The technical staff was scheduled for three days of evaluation and casting, after which they returned to Can Tho to modify casts and fabricate prostheses. There were no reported plans to perform any trial fittings and alignments or

whether they would fabricate all prostheses using bench alignment and then return only once for delivery. Technicians explained that equipment would be brought on the outreach to make any necessary modifications.

Recommendations for VNAH (both centers):

< Production still seems to take precedence over quality and educational efforts to date have had limited impact. Therefore, we recommend that an on-site technical person with sufficient qualifications and motivation to address quality issues and conduct retrospective evaluations should be added.

< An organized quality control plan and functional outcome study should be developed for the centers and any outreach projects. This plan should monitor durability of devices.

< In order to establish a baseline for future quality improvement, a focused technical assessment of current methods and procedures at the center should be conducted by a qualified prosthetist. (This could be a level I prosthetist from GTZ or an ABC certified consultant).

< Continuing education as described in the project implementation plan should be carried out, but perhaps only after and based upon the above assessment. In order to increase awareness of appropriate fit and alignment, any future education should include evaluation and checkout procedures for prostheses.

< A Category 1 prosthetist should dedicate at least 50% of full time FTE's to the project and should be charged with establishing a quality control program and evaluating outcomes of prosthetic intervention.

4. World Vision, Vietnam Projects

Summary:

The World Vision projects we visited show significant improvement in appearance of finished prostheses, organization and orderliness of facilities. In particular, WV is to be commended for initial efforts to document quality improvement and to monitor beneficiary impact. Their current goals for 1996 reflect an effort to complete training, facility, and equipment updates prior to the conclusion of funding.

World Vision has submitted the following goals for 1996:

I. Training

A. Upper-Extremity Prosthetics (Vinh Center)

1. AE and BE casting and socket design.
2. Develop a locally manufactured terminal device (voluntary closing type) for the laborer.
3. Select locally available control cables for the heavy duty user.
4. Train in double-wall arm fabrication techniques.
5. Train in harnessing techniques.

B. Lower Extremity Prosthetics (All Centers)

1. Continue training in patient evaluation procedures, socket design techniques, alignment procedures, and lightweight fabrication technologies.
2. Lower extremity thermoplastics (all centers).
3. Continue training in the use of thermoplastic orthotics for use in the treatment of polio, spinal cord, stroke, and head injury.
4. Continue training in the basic sciences of anatomy, physiology, and muscle testing and function.

C. Spinal Orthotics (All Centers)

1. Continue training in the use of thermoplastic spinal orthoses for the treatment of idiopathic scoliosis, polio, and low-back disorders.

II. Equipment

Install the following equipment at all four centers:

1. Compressed air system with regulators and air tools.
2. Vacuum system for resin lamination and thermoplastic fabrication.
3. Ventilation hoods for resin lamination.
4. Dust evacuation equipment for routers.

III. Establish safety protocols for eye and respiratory protection

IV. Train Center staff in the care and maintenance of all Center equipment

World Vision (Quy Nhon)

Activity:

At the World Vision supported rehabilitation center in Quy Nhon, we met with the director and chief technician (Cui), then toured the facility. Because we were only able to visit the center between the hours of 12pm - 1pm, no patients were observed being fitted during the time of our visit.

Observations:

The project has delivered 866 prosthetic-orthotic devices during the funding period to date and has projected 2,100 devices will be fabricated by the end of the grant. Periodic outreach projects are necessary to reach patients in more remote areas. Production projections were part of a joint agreement between World Vision and the Quy Nhon Center.

When asked if any new amputations were the result of UXO, the Director stated this was very rare and only occurs in remote areas near the Cambodian border or occasionally near the former North/South DMZ. The Quan Tri Center north of Hue apparently still reports mine and UXO injury. At the Quin Nhon Center, the Director stated more polio victims are seen than amputees and other pathologies such as cerebral palsy and spinal cord injury are also common. About 30% of patients seen are reported to never have had an orthopedic device. It is reported that among the disabled, men outnumber women 10 to 1. The Center reports that their prostheses last an average of three years, but prosthetic feet last no longer than 3-6 months. (This appears about average for Vietnam).

We observed several thermoplastic (KAFO) orthoses in production. They appear to have been modified and fabricated appropriately and included the relatively advanced method of vacuum forming over the joints. Mr. Pomatto reports that prosthetic methods are improving slowly through his mentoring.

Sockets we observed were well-designed and appeared to reflect appropriate biomechanical design, but no fittings were observed. The inside surface of sockets at this center were much smoother than in previous visits when it was observed that sockets were extremely rough, cloth was not completely saturated with plastic, and resin was sticky and incompletely cured. Mr. Pomatto reports that PVA is difficult and expensive to acquire, so technicians have developed a technique of dipping casts in paraffin to create a smooth parting agent (moisture barrier), prior to lamination with resin. In order to reduce weight and increase strength of materials, technicians in

this center report they use vacuum to assist all laminations. (This was not the case during previous visits). In addition, they are learning to hollow wood ankle blocks and shin sections to reduce weight prior to lamination. The center uses a team approach to evaluate, prescribe prostheses, and provide follow-up.

Dr. Hoang Van Cuc, Director of the center expressed a great deal of interest in quality and emphasized the importance of continuing education for his staff. He spoke of the important technical influence Mr. Pomatto was having upon the project and mentioned positive benefits of sending several technicians the Chiang Mai training program as well as the training several staff physicians received recently in India. In particular, he requested more training in orthotic care, in general, and thermoplastic orthotics, in specific. Mr. Pomatto has been introducing thermoplastic orthotic technology to the center. His approach to training is to spend one week demonstrating new techniques and working side-by-side with technicians, then following that with a second week of observation and critique as technicians practice the new method.

When asked how his practice had changed as a result of the formal and mentor training he had received, the chief technician reported he now knew how to correctly produce a PTB (Patella-Tendon-Bearing) prosthesis and that he understood the importance of vacuum and other methods necessary to produce stronger, lighter weight prostheses.

A commendable and unique feature of World Vision's management is their development of beneficiary satisfaction monitoring, outcomes questionnaires, and prosthetic evaluation forms. This aspect is currently unique to their program. They have just begun implementing these in their projects, but the concept appears to be gaining acceptability, particularly in the Quy Nhon Center. The impact of this data remains to be seen, but World Vision is beginning to establish a baseline and this should enable them to document quality improvement. (Samples of these forms are included).

World Vision (Danang Orthotics and Rehabilitation Center)

Activity:

We visited the project site, met with the Center's Director, Dr. Nguyen Duc Hoang, and evaluated six patients.

Summary:

As with the Quy Nhon Center, this facility has improved significantly from past visits in organization, management, and quality of services. This facility appears to be undergoing an evolution in concern for quality control, but lags slightly behind the Quy Nhon Center in this area.

Observations:

The Center produced 3290 prostheses in 1995 and projects a similar number this year with 8 outreach projects planned. In addition to the WV goals described above, the Center intends to develop a lighter version of their SACH foot and further upgrades in orthotic care. The Director reported that the Center's catchment area includes some 5,270,841 people with 33% of the entire population of the area considered disabled and 18% of that group are reported to be amputees, thus 313,087 amputees are reported.

Six patients were observed during our visit. Dr Huang informed us the patients had been selected at random and that he had not seen them before. One patient, a veteran with a short (proximal third), transfemoral amputation provided an interesting insight into current prosthetic knowledge. He was fit with a quadrilateral open ended plastic laminated socket with waist belt suspension, a donated (Otto Bock) weight-activated friction knee, and a donated (Kingsley 1 1/4" heel) SACH foot. He ambulated with a slightly hyperextended knee and the foot was designed for a much higher heeled shoe than he wore. Nevertheless, the prosthesis overall was at least bench aligned correctly. We were concerned that the high-heeled foot would be difficult to replace and would create alignment problems. The prosthetist demonstrated that he understood this challenge when he explained that when it became necessary to replace the foot, he would need to both lengthen and wedge a locally-made SACH foot.

Another patient with bilateral transtibial amputations appeared to ambulate beautifully, but when examined, presented significant pressure and abrasions due to poor fit. Although the prostheses were only a few months old, the heads of his fibulae were prominent on both sides, but neither socket reflected sufficient relief, and a bony prominence on the medial tibial flare of his right limb was not reflected in the socket. As a result, in an effort to avoid this excess pressure, he was wearing way too many prosthetic socks and therefore had pressure and skin breakdown over his anterior tibial tubercles and anterior distal tibiae. Both residual limbs showed evidence of proximal circumferential strangulation.

When questioned what he would do differently, the technician indicated he would simply grind down the patellar tendon "bars". (This would temporarily relieve the problem, but should not be the permanent solution.) His prostheses were to be modified before he left. Several other patients presented were also wearing too many socks. This is either a patient education deficiency, a socket fitting deficiency, or both.

Laminations were extra thick (6cm or more), partly for strength, because only cotton stockinette is available, but trimlines were often crudely trimmed and rough. Several sockets in various stages of fabrication were examined. All had very sharp edges, particularly in the hamstring area at the back of the socket. There was no indication that these sockets would undergo further modification prior to fitting. Because of sharp edges, we conclude that the quality of the

prosthetic sockets at the Danang Center were better than previous visits, but most were still unacceptable. The inside of sockets, however, were much smoother and outer shape and laminations reflected much greater attention to detail than on previous visits.

The facility was much more organized and orderly than on previous visits. Safety precaution signs were posted on equipment and staff are required to wear safety goggles when using power machinery, but none were observed in use. Several significant safety hazards were noted which included a large fan with no protective housing anchored to a chair in the center of the lab and a band-saw with no cover over the blade wheels. The issue of the band saw without protective coverings had been reported on previous visits and there is no evidence that the situation has been addressed.

These quality and safety issues were raised with the Director, who indicated he was very concerned with both issues and would make efforts to further address this with his staff. It should be noted that these concerns have been highlighted during previous site visits. In particular he emphasized the need to survey patient satisfaction and to implement greater quality control. He also discussed a recent survey conducted by a team from the center which showed that 21 of 25 patients surveyed were satisfied with his services. In the Danang Center, the quality of sockets and fittings observed were no better in quality of fabrication, biomechanical design, and adequacy of fit to the patient's limb than those observed at the VNAH centers.

Recommendations (General - World Vision)

< Before future training courses are planned, critical needs should be identified and prioritized. (We understand educational efforts have occurred related to the treatment of idiopathic scoliosis.) Operative choice cannot be the first choice in this environment. We question how such treatment fits into the national needs and infrastructure at this time and suggest that other priorities are more critical.

< Function for upper extremity amputees is an important issue, however we suggest efforts to develop components and train prosthetists in this area should not supersede more pressing issues such as the current high number of inadequately fitting lower limb prostheses. The majority of upper limb amputees have unfortunately been without prostheses for years. Studies in the US suggest that the critical time period for acceptability of an arm prosthesis is within the first three months after amputation and diminishes thereafter. Efforts to develop an upper extremity terminal device should not be a priority at this time.

< During the planning phase of any future curriculum, international organizations with appropriate experience in the developing world should be consulted. For example, World Orthopedic Concern, or its US counterpart, Orthopedics Overseas, the ISPO, GTZ or the American Academy of Orthotists and Prosthetists should be contacted regarding appropriateness of training in surgical orthopedics and rehabilitation.

- We question the necessity of the planned expensive and technically challenging addition of local exhaust hoods in a building open to the outside. Addition of exhaust fans and appropriate operational procedures should create sufficient air exchange.

- Regarding installation of a central vacuum system, we are concerned that such a system cannot be easily maintained and if the single central system fails, production may be brought to a halt or revert back to older techniques. We suggest this plan be carefully examined and should include a back-up contingency to cover down time. Effectiveness of current free-standing vacuum pumps can be improved through the addition of reserve tanks which provide much greater vacuum and more rapid, larger volume of air removal during vacuum-forming.

5. VVAF Orthotic Training and Outreach Program, Hanoi, Vietnam

Activity:

On Sunday morning, we met briefly with Chuck Searcy, Director of Vietnam Programs for VVAF. On Monday, we met with Dr. Tran Trong Hai, the head of the Rehabilitation Department (which includes the orthotics lab), and with Dr. Nguyen Thu Nhan, the Director of the Institute for the Protection of Child Health (IPCH). We visited the orthotics facility, observed an orthotic follow-up visit, observed casting in progress, interviewed and observed technicians working, and interviewed the technical supervisor, Mr. Pham.

Summary:

VVAF has established an up-to-date orthotics laboratory in the pediatric hospital at the IPCH in Hanoi. The orthotic team fits a steady flow of pediatric orthotic patients and appears on track with orthotic production projections for the funding period. Extensive client history and follow-up data is collected, but information critical to orthotic prescription, such as strength-testing, range-of-motion, and gait observation, are not emphasized. The staff are supervised locally by Quan Pham, an orthotic technician with a degree in robotics who has 5 years of experience as an orthotic technician and who was originally trained by Rehabilitation Engineering, an O/P firm owned by Jeff Fredericks. Mr. Pham is extremely conscientious and dedicated to his patients. He and the staff demonstrated good basic fabrication skills and an appreciation for many fundamentals of orthotic production. But before pursuing further upgrades in the services they provide, they should have much more guidance from a certified orthotist (US or European equivalent, or ISPO Category 1), with extensive pediatric experience.

Observations:

The VVAF project is located in the IPCH, the leading pediatric institution in Vietnam. Founded 27 years ago, the IPCH has received substantial support from the Swedish government during the last 15 years. The current 450 bed facility was apparently paid for by the Swedes. It includes 8 inpatient floors, emergency care, a neonatal and premature infant care unit, and comprehensive pediatric services including rehabilitation. The center's responsibilities include research, training, treatment of childhood diseases, and pediatric health protection for children ages 0 - 15 years. The Hospital Director reports over 400 outpatients are seen daily.

During a discussion about rehabilitation, we were given estimates that 5-7% of children in the country are disabled. This category includes 7 categories of diagnoses such as learning disabilities as well as orthopedic disabilities. Apparently polio is still a fairly common problem, but cases of recent onset have diminished significantly due to a country-wide immunization program. The Director reports that in 1986, only 30% of children were immunized, but today the number is closer to 85% in rural areas and near 100% in urban areas. (The population of Vietnam

is around 74 million).

In our interview with Dr. Hai, he explained that he has helped introduce CBR to the IPCH and to Vietnam. CBR is key, he feels to meeting the health needs of the country, since 70% of pediatric patients are unable to come to the clinic. He explained that he has led efforts to educate CBR workers, for example, to treat clubfoot early with splints or serial casting.

When asked about challenges to pediatric treatment in the Center, the Director explained that equipment and training needs are paramount. For example, she explained, the center has only one ultrasound machine and one non-operational CT Scan. Hematology equipment and general lab equipment and supplies are outdated and poorly supplied. No Internet connection is available, and although physicians have access to personal computers, no integrated computer communication system exists. Most medications are imported, although some raw materials are imported so medications can be synthesized locally.

The orthopedic (orthotic) lab is staffed by 3 technicians and Mr. Phan, who is charged with technical leadership of the team, shored up with periodic technical training from Mr. Jeff Frederick. Approximately 15 patients are seen for follow-up evaluation or casting daily. About 5-8 orthoses are reported to be casted daily. Turnaround for KAFO's is reported to be 2 weeks, and 1 week for AFO's. During the period May - Dec. 31, 347 orthoses were delivered. The project appears to be well on track to complete production numbers by the end of the funding period.

The patient logs provided in project quarterly reports included some areas over which we are concerned. For example, patients three months of age with a primary diagnosis of flat feet were being treated with molded plastic AFO's. This seems excessive and inappropriate. There are other log entries of orthotic treatment that appear to be of questionable value.

The approach to orthotic prescription includes prescription of the orthosis by a physician. During an interview with Lamine Mahrez, a German orthopedic engineer (Category I) from GTZ, he reported that he occasionally attends the pediatric orthopedic clinic at the Center in order to assist with the orthotic recommendation. Mr. Phan apparently does most of the casting and the technicians modify casts and fabricate orthoses. We are unclear what happens in his absence, but there was an indication that one of the other technicians would substitute. We observed a casting by Mr. Phan of a KAFO (knee-ankle-foot orthosis) for a child with a neuromuscular disorder. Mr. Phan controlled the foot and ankle while he casted the lower section. Then he casted above the knee. He correctly positioned the foot, ankle, and knee and appropriately identified anatomical landmarks.

Vacuum-formed polypropylene is the standard for orthoses at the Center. General fabrication quality is good and basics appear uniformly applied. For example, the plantar aspect of the calcaneus and the forefoot are parallel to each other, joints are correctly located and reasonably

square to one another, posterior distal and posterior proximal trimlines are flared and equidistant from orthotic joint centers to facilitate knee flexion and avoid pinching, etc.. However, during our observations of cast modification and fabrication, we noted several practice and fabrication inconsistencies as follows:

- Flathead rather than panhead screws were utilized to attach uprights to the plastic resulting in a sharp-edged, protruding screw head. At the least, this was esthetically poor and could tear clothing. At worst, it could cause breakage and injury.

- Most orthoses were padded with 1/4" Plastazote. In many cases, this included not only pressure-sensitive areas like the malleoli, but also areas such as the calf and thigh section of the orthosis where the purpose for padding soft-tissue areas was unclear. It also appeared that this padding was being added after plastic had been vacuum-formed, which would tend to make the orthosis too tight. Unfortunately, no fittings were observed.

-Several KAFO's, included only one 1" Velcro strap in the center of the thigh section and one toward the center of the AFO section. These were not optimally placed for stability and security.

-Some fabrication methods used appeared much more labor-intensive than necessary. For example, sandpaper was used to smooth plaster casts and build-ups rather than screenwire or some substitute such as netting. Sandpaper tends to immediately fill up with plaster residue, rendering it ineffective.

- No library of resources for technical staff was observed. When requested, some texts unrelated to fabrication were located.

Our interview with Mr. Pham, indicated understanding of state-of-the-art orthotic fabrication methods and general concepts. He is motivated and is working long hours at maximum capacity under difficult conditions. He should be commended for his dedication and efforts, but our impression is that he is being asked to assume the role of a Category I Orthotist, a position for which he has received no academic training and has no qualifications.

Following our visit, Jo Nagels, an orthotist employed VVAF in Cambodia, was asked to do an internal evaluation of the VVAF project in Vietnam. He observed the activities at the center over a 7 day period. His conclusions were similar to ours, primarily that the laboratory and technical work done at the project were generally very good and could be excellent with a few adjustments, but that the education levels and clinical-decision making capability of the current staff needed improvement through training.

Recommendations:

< The individual currently retained on site to manage the orthotic clinic and production area is clearly not qualified to carry this responsibility independently. His involvement in clinic decisions or other areas where he is acting as a Category I Orthotist should cease and he should be more closely supervised at the Category III level for which he is qualified.

< Due to limited time, we were unable to observe any orthotic fittings. The discrepancies in fabrication and finishing we noted lead us to believe a qualified orthotist needs to observe fittings and identify needs for future upgrade training. This could be done internally with the assistance of Jo Nagels from Cambodia VVAF project or Jeff Fredericks.

< Ideally, a qualified orthotist (American Board Certified CO or CPO or equivalent), should be retained on a full-time basis to insure this project meets the goals of the grant. But, the availability of German-trained Orthopedic Meisters with GTZ in Hanoi provides VVAF with a unique local opportunity for orthotic consultants. During our discussions with GTZ staff, they indicated they would be very interested in providing such consulting services. We suggest VVAF seriously investigate this potential relationship.

6. Meeting with GTZ

We met with Sepp Heim and Lamine Mahrez and discussed progress of the VietCot educational program, a joint effort between Vietnam and GTZ, the German Agency for Technical Cooperation. Staff from GTZ have been in-country 2 ½ years working with MOLISA toward the establishment of a 3-year training program for orthotics and prosthetics. A five-story building which will house the school is nearing completion in Hanoi. GTZ has committed staff and financial support for the program through the year 2001. Successful graduates would be eligible for Category II status.

It is proposed that the educational program will become a department of MOLISA's Social School. Thus students would first complete 12 years of training prior to entrance into the 3-year program.

Two full-time expatriate Category I instructors will staff the program. They will be responsible for teaching prosthetic-orthotic biomechanics, P & O techniques, gait analysis, and facility management. Additional support staff and instructors will be Vietnamese who have received advanced training. GTZ and MOLISA are currently working to identify these individuals.

In conjunction with the 3-year program, the faculty will provide country-wide upgrade courses for prosthetists and orthotists currently practicing in the various rehabilitation centers. About 12 - 15 students would attend each course. Two such upgrade courses of 3 weeks each are proposed for early 1998. The first would focus on Above-Knee (Transfemoral) and Below-Knee (Transtibial) prosthetics, the second on Knee and Hip disarticulation prosthetics.

One of the challenges we discussed is the acceptance of the examination process in Vietnam. Apparently, during the establishment of the GTZ educational program in China, the traditional Western and European exam process for determining skill and knowledge mastery was not well-accepted initially, although the exam process has now gained acceptance in China. Having learned from this experience, GTZ is proposing that both upgrade courses and formal training in orthopedic technology in Vietnam should include a linkage between demonstrated knowledge and skill and pay scale. Thus advancement in salary grades would be based on completion of an examination process and/or demonstration of skill mastery. A related concern is the potential for graduates to displace or conflict with technicians currently working in the field who have considerably more experience. Such long-term issues are subjects of ongoing discussion between MOLISA, GTZ, and various NGO's and Centers providing P & O services. It is very positive and essential that such concerns are dealt with realistically as prosthetic-orthotic education and service evolves in Vietnam. GTZ has developed an effective method for working within the infrastructure of the countries where they work in order to accomplish goals cooperatively.

7. POF (Prosthetic Outreach Foundation)

Activity:

We met with Ray Pye and the local staff of the POF clinic, toured the facility, saw several patients and visited the construction site of the Vietcot school and the future location of the POF clinic.

Summary:

Proposed activities continue, slightly behind schedule mainly due to transitions in location. More significantly, in cooperation with local engineers, POF, has begun major efforts to develop durable locally-made components and to establish tolerances. This is a major step toward the sustainability of the AFMA (Automated Fabrication Mobility Aids) approach in Vietnam and could eventually have a major impact upon production of components for other centers.

Observations:

The clinic has been displaced to a much smaller facility, but has continued production and development of services while new facilities are completed. The move to the new facility is proposed for June of 1997. The new site will house the Vietcot school, the Institute of Rehabilitation and Orthopedic Sciences, and the POF clinic. Both GTZ and POF indicated that some aspect of CAD CAM training will be part of the curriculum of the Vietcot school.

Although production has continued, delays by monsoons of outreach trips and transitions to and potentially from this facility may mean that production projections will not be met without a further no-cost extension. Both software and hardware necessary for the automated fabrication used at this center are currently covered by a maintenance contract with MIND in Seattle (Mind Trust).

An evaluation of services, which included visual inspection, and interviews with patients was completed by the Institute and POF in August of 1995. Of the three patients I interviewed, all stated their prosthesis was more than three years old and that their feet had lasted. It has been used to determine objectives for improved patient satisfaction and performance improvement at the center. Through our interview, we identified the following efforts to improve quality and durability:

- Develop a complete line of locally-made components including feet, knees, ankle adaptors, etc.

- Develop a foot adaptor to be used with long transtibial amputations. Since such limbs cannot be digitized nor carved easily, POF has been extending casts, with built-in static

alignment, so that a hollow, open ended socket and shin can be vacuum-formed in one piece including the foot connector.

- Improve durability of prosthetic feet by introducing anti-bacterial agents and increasing density of urethane.

-Establish acceptable tolerances for these components and accept only those components that are within tolerance ranges. The Bah Vih Orthopedic Technology Center is the most likely producer of these components.

Recommendations:

< We are glad to see POF is addressing the need for components to be developed and manufactured locally. Their efforts in working with the Vietnamese to develop manufacturing systems and establish engineering tolerances for components should be supported and continued. The need for durable, locally manufactured components, particularly prosthetic feet, is vital to future sustainability of prosthetic-orthotic services in the country.

Country-Wide Recommendations:

< Our observation is that there is no facility in Vietnam currently providing comprehensive prosthetic orthotic services that would meet even minimal standards in the US. In order to move toward quality and away from quantity alone, MOLISA and the Steering Committee should develop a country-wide plan for outcome studies, user surveys, durability surveys, and functional outcomes studies that would be used by all projects under MOLISA.

< Patrick Bracken of World Vision has suggested a cost-recovery system for Vietnam that would include patient acceptance of quality of the device before payment would be made. We recommend further investigation and consideration of such a system to avoid the current emphasis upon production alone.

< Future country-wide focus should be on quality and sustainability issues rather than numbers of prostheses produced.

< As a further control of quality, HVO should be encouraged to develop training programs for final evaluation or "check-out" of prostheses to be utilized by physical therapists as they train patients or prescribing physicians as they make decisions regarding the need for prosthetic-orthotic devices. Under the current system, there are virtually no "checks and balances" for quality control.

< All projects should include a plan for how to integrate future graduates of the proposed GTZ (Vietcot) program. Future plans should also focus on working with GTZ and the Vietcot prosthetic-orthotic program to plan, participate in, and possibly help fund appropriate upgrade training for current technicians. This will help keep their skills at a competitive level with future graduates.

< It is worth considering the possibility that one or more full-time expatriate prosthetists could be hired to divide their time between several of the projects. The need for in-depth mentor training in technical as well as facility management areas is very evident in most of the projects we have evaluated. Craig Pomatto, though not full-time, has had a significant positive impact on the Quy Nhon project.

Appendices

Schedule / Persons Contacted

Saturday, May 4 - Sunday, May 5
- Travel, DFW - Tokyo - Bangkok

Monday, May 6
- Travel, Bangkok - Saigon

1. Visit ICRC Center, Ho Chi Minh City
   - Dr. Nhaa, Director of Center (operates under Ministry of Health)
2. Telephone interview, HVO
   - Kirk Gray, HVO Project Coordinator

Tuesday, May 7

1. Visit HVO Physical Therapy Course, National Rehabilitation Center, HCMC
   - Kirk Gray, HVO Project Coordinator
   - Celia Pechak, PT, MPH (HVO Volunteer)
   - Physical Therapy Instructors
2. Visit Vietnam Assistance for the Handicapped (VNAH), Project Thu Duc
   - Ca Van Tran, Project Director
   - Mr. Bui Van Tien, Director
   - Ken Caplan, VNAH Field Coordinator
3. Travel to Can Tho, visit VNAH Center
   - Ca Van Tran, Project Director

Wednesday, May 8

1. Drive to Kien Giang in Mekong Delta, observe VNAH Outreach (Pt. Evaluations)
   - VNAH Technicians, Ca Van Tran, Kent
   - Dr. Doan Tuyet Anh, Director, MOLISA (Kien Giang Province)
2. Drive back to HCMC

Thursday, May 9

1. Fly to Quy Nhon
2. Visit World Vision Project, Quy Nhon
   - Patrick Bracken, Project Manager World Vision International
   - Craig Pomatto, CPO, Project Technical Advisor
   - Huang Van Cuc (Engineer, Ortho Pacide and Rehabilitation Center Director)
3. Visit Quy Nhon Leprosy Center

Friday, May 10

1. Drive to Danang
2. Visit Danang Orthotics and Rehabilitation Center (WVI project)
   - Craig Pomato
   - Patrick Bracken
   - Dr. Nguyen Duc Hoang, Director Danang O/P and Rehab. Center
   - Mr. Tran Khoi, Engineer Danang Orthotics and Rehabilitation Center

Saturday, May 11

1. Fly to Hanoi
2. Meet Chuck Searcy, Director of Vietnam Programs,VVAF

Sunday, May 12

- Write report of first "leg" of trip

Monday, May 13

1. Evaluate VVAF project, Hanoi
   - Chuck Searcy, Director of Vietnam Programs, VVAF
   - Sarah Pfeiffer, Program Assistant, VVAF
   - Quan Pham, Orthotic Technician, technical supervisor, VVAF
   - Dr. Nguyen Thu Nhan, Prof. Of pediatrics, Director of Institute for Protection of Children's Health

Tuesday, May 14

1. Meet with GTZ
   - Sepp Heim
   - Lamin Mahrez
2. Visit POF
   - Ray Pye, POF engineer
   - Mr. Duc (Engineer, manager of Hanoi prosthetics outreach center)

Wednesday, May 15

1. Attend Conference on Technology Development of Prosthetics and Orthopedics.

Thursday, May 16

1. Attend day 2 of Conf. On Technology Development of Prosthetics and Orthopedics

Friday, May 17

1. Meet with World Vision (Patrick Bracken and Suzanne E. Ware, Country Director
2. Debrief at US Embassy
3. Meet with Mr. Tue
4. Meet with GTZ staff

This Questionnaire belongs to the Vietnam Rehabilitation Project - Funded by USAID and World Vision and working in cooperation with the Ministry of Labor, Invalids and Social Affairs.The purpose of this form is to collect information in order to enhance the service provision to the disabled people. We would request the beneficiaries to read the questions carefully and to provide short and clear answers. Your cooperation in completing this questionnaire is sincerely appreciated."

[ ] ***Patient is wearing the device*** [ ] ***Patient is not wearing the device***

MAIN INFORMATION ABOUT BENEFICIARY

1. Full Name: ..... ***Sex:*** [ ](1) *Male* [ ](2) *Female*

2. Date of Birth: ..... / ..... / 19 .....

3. Present Address: *(Do not write in an abbreviated form, Pls.)* .....
City / District ..... *Province* .....

4. Marital Status:
Married ..... [ ](1)
Single ..... [ ](2)
Divorced ..... [ ](3)

5. Number of Children: .....

TYPE OF DISABILITY

6. Upper Extremity Amputation:

LOCATION	*LEFT*	*RIGHT*
Shoulder Disarticulation	[ ]	[ ](1)
Above Elbow	[ ]	[ ](2)
Below Elbow	[ ]	[ ](3)

7. Lower Extremity Amputation:

LOCATION	*LEFT*	*RIGHT*
Hip Disarticulation	[ ]	[ ](1)
Above Knee	[ ]	[ ](2)
Knee Disarticulation	[ ]	[ ](3)
Below Knee	[ ]	[ ](4)
Ankle Disarticulation	[ ]	[ ](5)
Partial Foot	[ ]	[ ](6)

8. Paralysis:

LOCATION	*LEFT*	*RIGHT*
Hip	[ ]	[ ](1)
Thigh	[ ]	[ ](2)
Shank	[ ]	[ ](3)
Partial Foot	[ ]	[ ](4)
Back	[ ](5)	

THẾ GIỚI QUỐC TẾ NHÌN World Vision Vietnam

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World Vision
Vietnam

CAUSE OF DISABILITY

9. By War:
Mine ..... [ ](1)
Bomb ..... [ ](2)
Projectile ..... [ ](3)
Other ..... [ ](4)

10. By Accident:
Traffic ..... [ ](1)
Working ..... [ ](2)
Living ..... [ ](3)
Other ..... [ ](4)

11. By Illness:
Polio ..... [ ](1)
Leprosy ..... [ ](2)
Circulatory ..... [ ](3)
Other ..... [ ](4)

12. Disability Onset Date: ..... / ..... / 19....

INFORMATION ABOUT DEVICE

13. Type of device you received: .....

14. Date and where received: *Received on* ..... / ..... / 19 ... *From* ..... *Rehabilitation Centre.*

15. How many hours per day do you wear the device at home / at work:
Do not wear ..... [ ](1)
From 0 to 1 hour ..... [ ](2)
From 1 to 3 hours ..... [ ](3)
From 3 to 5 hours ..... [ ](4)
All day ..... [ ](5)

16. Where do you wear your device:
At home ..... [ ](1)
Around the home (inside/outside)..... [ ](2)
In the community ..... [ ](3)
At work / Everywhere ..... [ ](4)
In the field ..... [ ](5)
Other environment: (Pls., comment) .. [ ](6).....

17. Do you repair your device? How many times? *Repaired* ..... *times*
Centre Repaired [ ](1) *Self Repaired* [ ](2)

18. Longevity of failed component(s):
Knee .....(1)[ ] *Used* .....*month*
Knee Joint ..... (2)[ ] *Used* .....*month*
Ankle Joint ..... (3)[ ] *Used* .....*month*
Foot ..... (4)[ ] *Used* .....*month*

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World Vision Vietnam

Socket ..... (5)[ ] *Used* .....*month*
Shank ..... (6)[ ] *Used* .....*month*
Side Bar ..... (7)[ ] *Used* .....*month*
Shoes/Sandal ..... (8)[ ] *Used* .....*month*
Suspension,Lather Straps ..... (9)[ ] *Used* .....*month*

19. Your comments about quality of device:

Your comment about	GOOD (2)	FAIR (1)	POOR (0)	*Do you have any other comments?*
Weight				*No* [ ](1)
Durability				*Yes (Pls., comment)* [ ](2)
Dimension				.....
Cosmesis				.....
Comfort				.....

SOCIO-ECONOMIC BENEFITS

20. What did you do before your disability:

Soldier ..... [ ](1)
Farmer ..... [ ](2)
Fishing ..... [ ](3)
Small Trader ..... [ ](4)
Worker (Carpenter, Mechanical, ect) ..... [ ](5)
Other (Pls., comment)..... [ ](6)

21. Have you changed your job as a result of your disability? *Yes* [ ](1) *No* [ ](2)
To what? .....

22. What do you do now for helping yourself and your family:

Officer ..... [ ](1)
Farmer ..... [ ](2)
Fishing ..... [ ](3)
Small Trader ..... [ ](4)
Worker (Carpenter, Mechanical, ect) ..... [ ](5)
Other (Pls., comment)..... [ ](6)

23. Has the device helped you in your work: *Yes* [ ](1) *No* [ ](2)
How did the device help you: .....

24. Project input needed: *(This space for Monitoring Officer only)* .....
.....
.....
.....
.....
.....

Examiner: *Date* ..... / ..... / *19* ....

A/K Evaluation Form

World Vision Vietnam

Prosthetist Name: Prosthetist ID # Date: Grade:

Patient Name: Patient ID # Age: Height: Weight:

B/K: Symes: Right: Left: Suspension Type: Knee Type: Foot Type:

(Successful completion of each requirement is equal to 4 points: 80 - 100 = Level A, 60 - 79 = Level B)

Socket Fit

- ☐ Is the interior of the socket smooth and free of cracks?
- ☐ Does the shape of the socket match the shape of the patients stump?
- ☐ Is pressure being distributed evenly over the appropriate weight bearing surfaces?
- ☐ Are the trim lines of the socket correct and follow the contours of the patients leg?
- ☐ Is the length of the socket correct?
- ☐ Is the adductor longus tendon properly located in its channel?
- ☐ Does the ischeal tuberousity rest properly on the ischeal seat?
- ☐ Is the patient free from vertical pressure in the area of the perineum?
- ☐ Is the brim of the posterior wall approximately parallel to the floor?

Alignment

- ☐ Is the prosthesis the correct length?
- ☐ Is the A/P alignment of the prosthesis correct?
- ☐ Is the M/L alignment of the prosthesis correct?
- ☐ Does the patient feel comfortable and stable while walking?
- ☐ Does the patient feel comfortable and stable while standing?
- ☐ Can the patient walk up and down stairs adequately?
- ☐ Does the rotation angle of the prosthetic foot match the angle of the patients foot?

Suspension

Silesian

- ☐ Is the piston action between the stump and the socket minimal?
- ☐ Are the lateral and anterior attachments of the Sileision bandage correctly located?
- ☐ Are the suspension attachment points flush mounted and smooth

Pelvic Joint

- ☐ Is the piston action between the stump and the socket minimal?
- ☐ Does the pelvic band accurately fit the contours of the body?
- ☐ Is the center of the pelvic joint set slightly above and ahead of the promontory of the greater trochanter?

Workmanship

- ☐ Is the exterior lamination smooth, free of air bubbles, and of the desired thickness?
- ☐ Does the size, contours, and color of the prosthesis match the patients sound side?
- ☐ Is the weight of the prosthesis appropriate.
- ☐ Is the foot - ankle attachment correct?
- ☐ With the prosthesis in the kneeling position , can the thigh piece be brought to at least the vertical position?
- ☐ Are the foot and knee mechanism clean, free of resin, and writing?

B/K Evaluation Form

Prosthetist Name: Prosthetist ID # Date: Grade:

Patient Name: Patient ID # Age: Height: Weight:

B/K: Symes: Right: Left: Suspension Type: Foot Type:

(Successful completion of each requirement is equal to 5 points: 80 - 100 = Level A, 60 - 75 = Level B)

Socket Fit

- ☐ Is the interior of the socket smooth and free of cracks?
- ☐ Does the shape of the socket match the shape of the patients stump?
- ☐ Is pressure being distributed evenly over the appropriate weight bearing surfaces?
- ☐ Are the trim lines of the socket correct and follow the contours of the patients leg?
- ☐ Is the length of the socket correct?

Alignment

- ☐ Is the prosthesis the correct length?
- ☐ Is the A/P alignment of the prosthesis correct?
- ☐ Is the M/L alignment of the prosthesis correct?
- ☐ Does the patient feel comfortable and stable while walking?
- ☐ Does the patient feel comfortable and stable while standing?
- ☐ Can the patient walk up and down stairs adequately?
- ☐ Does the rotation angle of the prosthetic foot match the angle of the patients foot?

Suspension

Cuff

- ☐ Is the piston action between the stump and the socket minimal?
- ☐ Does the knee cuff maintain its position during gait.
- ☐ Are the suspension attachment points flush mounted and smooth

Thigh Corset

- ☐ Do the uprights conform to the flair's above the epicondyles?
- ☐ Are the knee joints close to the epicodyles? (1/8" - 1/4")
- ☐ Does the thigh corset fit correctly

Workmanship

- ☐ Is the exterior lamination smooth, free of air bubbles, and of the desired thickness?
- ☐ Does the size, contours, and color of the prosthesis match the patients sound side?
- ☐ Is the weight of the prosthesis appropriate.
- ☐ Is the foot - ankle attachment correct?
- ☐ Is the foot clean and free of resin and writing?

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PATIENT NAME: ID #

DEVICE RECEIVED

WHEELCHAIR:

DATE RECEIVED / / WHERE RECEIVED

PRESENT CONDITION:: GOOD FAIR POOR NOT USEABLE

PROSTHESIS:

TYPE DATE RECEIVED / / WHERE RECIEVED

PRESENT CONDITION : GOOD FAIR POOR NOT USUABLE

REPAIR HISTORY: CENTER REPAIRED SELF REPAIRED HOW MANY TIMES

COMPONENT F
ORTHOSIS CRUTCH

COMMENTS:
(utility and limitations of device)

REPAIR HISTORY

TẦM NHÌN THẾ GIỚI QUỐC
World Vision

World Vision Vietnam

BENEFICIARY INFORMATION

NAME DOB / / ID #

PRESENT ADDRESS

PERMANENT ADDRESS:

MARITAL STATUS: SINGLE MARRIED DIVORCED NUMBER OF CHILDREN

OCCUPATION:

TYPE OF DISABILITY

UPPER EXTREMITY AMPUTATION:

R S/D L S/D R A/E L A/E R B/E L B/E R PARTIAL HAND L PARTIAL HAND

LOWER EXTREMITY AMPUTATION:

R H/D L H/D R A/K L A/K R B/K L B/K R SYMES L SYMES R PARTIAL FOOT L PARTIAL FOOT

PARALYSIS:

R ARM L ARM R LEG L LEG TORSO

CAUSE OF DISABILITY

WAR:

MINE BOMB PROJECTILE

ACCIDENT:

MOTORCYCLE CAR BICYCLE TRAIN BUS ON THE JOB INJURY

ILLNESS:

POLIO CEREBRAL PALSEY STROKE DISORDER VASCULAR INSUFFICIENCY LEPROSY

BENEFICIARY INFORMATION

NAME DOB / / ID #

PRESENT ADDRESS

PERMANENT ADDRESS:

MARITAL STATUS: SINGLE MARRIED DIVORCED NUMBER OF CHILDREN

OCCUPATION:

TYPE OF DISABILITY

UPPER EXTREMITY AMPUTATION:

R S/D L S/D R A/E L A/E R B/E L B/E R PARTIAL HAND L PARTIAL HAND

LOWER EXTREMITY AMPUTATION:

R H/D L H/D R A/K L A/K R B/K L B/K R SYMES L SYMES R PARTIAL FOOT L PARTIAL FOOT

PARALYSIS:

R ARM L ARM R LEG L LEG TORSO

CAUSE OF DISABILITY

WAR:

MINE BOMB PROJECTILE OTHER

ACCIDENT:

MOTORCYCLE CAR BICYCLE TRAIN BUS ON THE JOB INJURY OTHER

ILLNESS:

POLIO CEREBRAL PALSY STROKE DISORDER VASCULAR INSUFFICIENCY LEPROSY OTHER

DISABILITY ONSET DATE:

DEVICE RECEIVED

WHEELCHAIR:

DATE RECEIVED / / WHERE RECEIVED

PRESENT CONDITION:: GOOD FAIR POOR NOT USEABLE

PROSTHESIS:

TYPE DATE RECEIVED / / WHERE RECEIVED

PRESENT CONDITION : GOOD FAIR POOR NOT USABLE

REPAIR HISTORY (HOW MANY TIMES): CENTER REPAIRED SELF REPAIRED

LONGEVITY OF FAILED COMPONENT(S): FOOT KNEE SOCKET SHANK SUSPENSION

World Vi... Vietnam

World Vision Vietnam

ORTHOSIS:

TYPE DATE RECEIVED / / WHERE RECEIVED

PRESENT CONDITION : GOOD FAIR POOR NOT USABLE

REPAIR HISTORY (HOW MANY TIMES): CENTER REPAIRED SELF REPAIRED

LONGEVITY OF FAILED COMPONENT(S): KNEE JOINT ANKLE JOINT SIDEBAR SHOE LEATHER STRAPS

DEVICE FUNCTION

ARE YOU SATISFIED WITH THE COMFORT OF THE DEVICE?: SATISFIED SOMEWHAT SATISFIED NOT SATISFIED

HOW MANY DAYS WERE YOU UNABLE TO WEAR THE DEVICE BECAUSE IT CAUSED YOU PAIN?:

HOW MANY DAYS WERE YOU UNABLE TO WEAR THE DEVICE BECAUSE OF SKIN SORES?:

NUMBER OF HOURS A DAY DEVICE IS WORN:

AMBULATION ABILITY: COMMUNITY AMBULATOR LIMITED COMMUNITY AMBULATOR HOUSEHOLD AMBULATOR

LIMITED HOUSEHOLD AMBULATOR

DEVICE IS USED IN: PRIMARILY RURAL ENVIRONMENT RURAL/CITY ENVIRONMENT CITY ENVIRONMENT

ARE YOU SATISFIED WITH THE COSMESIS OF THE DEVICE? SATISFIED SOMEWHAT SATISFIED NOT SATISFIED

WITH ARE YOU SATISFIED THE WEIGHT OF THE DEVICE ? SATISFIED SOMEWHAT SATISFIED NOT SATISFIED

WITH ARE YOU SATISFIED THE DURABILITY OF THE DEVICE ? SATISFIED SOMEWHAT SATISFIED NOT SATISFIED

SOCIO-ECONOMIC BENEFITS

WERE YOU EMPLOYED PRIOR TO YOU DISABILITY?

HAS YOUR DEVICE HELPED YOU TO FIND EMPLOYMENT?

HAVE YOU CHANGED OCCUPATIONS AS A RESULT OF YOUR DISABILITY? TO WHAT

EXAMINER: DATE / /

ORTHOSIS:

TYPE DATE RECEIVED / / WHERE RECEIVED

PRESENT CONDITION : GOOD FAIR POOR NOT USABLE

REPAIR HISTORY (HOW MANY TIMES): CENTER REPAIRED SELF REPAIRED

LONGEVITY OF FAILED COMPONENT(S): KNEE JOINT ANKLE JOINT SIDEBAR SHOE LEATHER STRAPS

World Vision Vietnam

DEVICE FUNCTION

ARE YOU SATISFIED WITH THE COMFORT OF THE DEVICE?: SATISFIED SOMEWHAT SATISFIED NOT SATISFIED

DURING THE LAST MONTH WERE YOU UNABLE TO WEAR THE DEVICE BECAUSE IT CAUSED YOU PAIN?:

DURING THE LAST MONTH WERE YOU UNABLE TO WEAR THE DEVICE BECAUSE OF SKIN SORES?:

AMBULATION STATUS: COMMUNITY LIMITED COMMUNITY HOUSEHOLD LIMITED HOUSEHOLD

DEVICE IS USED IN: PRIMARILY RURAL ENVIRONMENT RURAL/CITY ENVIRONMENT CITY ENVIRONMENT

ARE YOU SATISFIED WITH THE COSMESIS OF THE DEVICE? SATISFIED SOMEWHAT SATISFIED NOT SATISFIED

ARE YOU SATISFIED WITH THE WEIGHT OF THE DEVICE ? SATISFIED SOMEWHAT SATISFIED NOT SATISFIED

ARE YOU SATISFIED WITH THE DURABILITY OF THE DEVICE ? SATISFIED SOMEWHAT SATISFIED NOT SATISFIED

DO YOU WEAR YOUR DEVICE AT WORK?

DO YOU WEAR YOUR DEVICE AT HOME?

SOCIO-ECONOMIC BENEFITS

WERE YOU EMPLOYED PRIOR TO YOU DISABILITY?

HAS YOUR DEVICE HELPED YOU TO FIND EMPLOYMENT?

HAVE YOU CHANGED YOUR OCCUPATIONS AS A RESULT OF YOUR DISABILITY? TO WHAT

EXAMINER: DATE / /

BENEFICIARY INFORMATION

NAME DOB / / ID #

PRESENT ADDRESS

PERMANENT ADDRESS:

MARITAL STATUS: SINGLE MARRIED DIVORCED NUMBER OF CHILDREN

OCCUPATION:

TYPE OF DISABILITY

UPPER EXTREMITY AMPUTATION:

R S/D L S/D R A/E L A/E R B/E L B/E R PARTIAL HAND L PARTIAL HAND

LOWER EXTREMITY AMPUTATION:

R H/D L H/D R A/K L A/K R B/K L B/K R SYMES L SYMES R PARTIAL FOOT L PARTIAL FOOT

PARALYSIS:

R ARM L ARM R LEG L LEG TORSO

CAUSE OF DISABILITY

WAR:

MINE BOMB PROJECTILE OTHER

ACCIDENT:

MOTORCYCLE CAR BICYCLE TRAIN BUS ON THE JOB INJURY OTHER

ILLNESS:

POLIO CEREBRAL PALSY STROKE DISORDER VASCULAR INSUFFICIENCY LEPROSY OTHER

DISABILITY ONSET DATE:

DEVICE RECEIVED

WHEELCHAIR:

DATE RECEIVED / / WHERE RECEIVED

PRESENT CONDITION:: GOOD FAIR POOR NOT USEABLE

PROSTHESIS:

TYPE DATE RECEIVED / / WHERE RECEIVED

PRESENT CONDITION : GOOD FAIR POOR NOT USABLE

REPAIR HISTORY (HOW MANY TIMES): CENTER REPAIRED SELF REPAIRED

LONGEVITY OF FAILED COMPONENT(S): FOOT KNEE SOCKET SHANK SUSPENSION

ORTHOSIS:

Regulations of the quality of orthoses and prostheses of
Vinh Orthopedic and Rehabilitation Centre

TẦM NHÌN THẾ GIỚI QUỐC TẾ World Vision Vietnam

I. Bellow knee. (BK)

a. Socket: 15 marks

- Must be smooth without crack and split.
- Accurate fulcrum with appropriate thickness.
- Measurement figures in socket have to fit measurement recommended by doctor.
- length of the socket is longer than the stump from 3 to 4 cm.
- Socket must display features of the stump designed by doctor's recommendation.

* If all 5 above requirements are achieved = 15 marks, and loss of 1 requirement = 3 marks deducted.

b. Structure: 20 marks

- Solid structure, have defined stockinet coats.
- Alignment is accurate.
- The height of BK prosthesis is as high as the real leg follow doctor's recommendation (error of ±0.5cm
- Foot fits tightly with ankle (no resin clot sticking to the surface of foot.)

- For BK with 8 cuff : fit screw tightly into the correct position and the bolt must be riveted. The inner socket bolt must be flush.
- For BK with leather insert: two knee joints must be parallel, center of knee joint must be 5 cm far from kneecap, leather insert must fit the thigh, fixing bolt and machine oil for bearing are available.

* If all 5 requirements are achieved = 20 marks , loss of one = 4 marks deducted)

c. Gait: less than 15 marks

- Suitable skin colour, smooth lamination without air bubbles.
- Reasonable measurement are fit for real leg (have calf, ankle...)
- No black spot due to residue from sawdust.
- When let BK on the plane surface, not being felt down, nice and proportional form.
- Proper ventilation hole , no writing on the foot.

* If all 5 requires are achieved = 15 marks, and loss of one 4 marks deducted.

d. Mechanicsand weight: 10 marks

- For BK with leather insert:

- Joint has been fitted tightly to the socket and has a good galvanised coat.
- Leather insert must be riveted to flush joint tightly on the outside and the interior was flush fitting
- Screw of foot must be fitted firmly, if a screw has a worn-out thread, the foot will come loose.
- Screw must be hard and firm, head of the screw must be not sharp and must contact with patient's trousers .

- The weight of BK with leather insert should be around 1.6 to 2.3 kg.
- Of BK with 8 cuff: 1.1 to 1.6 kg.
- Of Syme: 1.1 to 1.4 kg.

* All above 5 requires achieved = 10 marks, and loss of one = 2 marks deducted)

e. **Check prosthesis when patient uses it :** 40 marks

1. Does the prostheses fit the patient ?
2. Did patient feel comfortable and stable with the device when patient walked and stood ?
3. Did patient feel any pain in knee? did the back of the knee back swell ?
4. Did patient feel comfortable when standing at attention and relaxed ?...
5. Is height of BK suitable?
6. Is leather insert fitted well?
7. Is the string used suitable for adjusting the force?
8. Did patient feel BK comfortable when they bend the knee ?
9. Could patient walk up and down stairs ?
10. Is the patient satisfied with the device ?

* **Note**: Check devices when devices are put in a warehouse:

- If devices achieve from 80 - 100 marks, it will get level A.
- 60 - 79 marks, it will get level B.

II. Above the knee prosthesis (AK)

a. **Socket:** 15 marks.

- Must be smooth - without any cracks . Wood used must not be .termite affected. If a wooden socket, the inside must be coated with polyester resin or of varnish.
- Front and outside wall of socket must be higher than rear wall by at least 5 cm. ???
- The thickness of fulcrums must be 1.5-2 cm and thickness of socket must be exactly 1 cm.
- The form of the socket must fit the form of the stump (long or short stump.)
- Outside of socket is firm and when fitted to the stump.

b. **Structure:** 20 marks

- Firm structure, measurement and alignment must be accurate.
- Bolt for string is fitted properly.
- Knee joint axle is solid and oiled for good mobility.
- The height of prosthesis is as high as real leg with error of ± 0.5 cm
- The foot fits tightly to ankle block without any resin clot sticking to it.

c. **Gait:** 15 marks

- Suitable skin colour, smooth lamination and without air bubbles.
- Accurate measurement of prosthesis must match real leg such as thigh and ankle.
- No black spot caused by sawdust residue....
- Prosthesis must not fall out when on a plane surface and must be good appearance.

d. **Mechanicsand weight:** 10 marks

- Screws and bolts must fit firmly, machine oiled to avoid rust and ease of mobility.

* Axle of foot must not wear out the thread and showed fit with tight.

- For wood laminate AK working : weight from 2.0 - 2.5 kg.
- For resin laminate AK with resin socket : weight from 1.6 - 2 kg.
- For resin laminate AK working with resin socket : weight from 1.6 - 2.2 kg.

- String is firm and durable, and ventilation hole is properly drilled.

e. **Check prosthesis when patient uses it.**

The same as in BK checking procedures, in addition :

1. Is the part which replaces the superior extremity of the femur in correct position.
2. Is the rim of the rear wall of the device parallel to the plane surface ?
3. Did patient feel vertical pressure from the heel ?
4. Is the string fixed properly ?

III. Artificial Arm

1. Bellow Elbow arm (BE) :

a. **Socket:** 20 marks

- Must fit the stump, be smooth, and of similar thickness to the good arm without crack and split.
- Measurements are accurate.

b. **Structure:** 20 marks

- Firm, good and suitable.
- Hand fits tightly into the socket.
- The length of the arm is as in doctor' measurements.
- Leather insert is fitted to socket and held tightly with the socket.

c. **Gait:** 20 marks

- Match patient skin colour, smooth lamination.
- Circumference fits the real arm.
- Good form and hand suits the socket.
- The rim of arm must be proper, smooth and tapered .
- There are enough ventilation holes (from 5-7 holes) of the diameter Φ 5 cm.

d. **Check prosthesis when patient uses it :** 40 marks

1. Does it fit patient ? Is it comfortable and matches patient skin ?
2. Does the BE device fit the patient's stump ?
3. Is the length of the BE prosthesis as long as real arm ?
4. Is the leather insert firm and suitable ?
5. Is there any skin discoloration, or scratch when the BE prosthesis is taken off ?

* Total of 2 parts : 100 marks

2. Above Elbow prosthesis (AE)

a. **Socket:** 20 marks

- Upper and lower socket are in proportion (circumference of device matches with real arm.)
- Smooth and without air bubbles and any cracks.
- Durable and of similar thickness.
- The circumference of the stump is the same as the circumference of the socket.

b. Structure: 20 marks

- Firm.
- The upper and lower elbow parts are proportional and fixed tightly to elbow.
- The hand is fitted tightly to the socket.
- String is fitted properly and can easily be removed.
- The length of AE prosthesis is as long as the real arm and in proportion to elbow joint

c. Gait and Weight : 20 marks

- Matching skin cclour and good lamination without patches.
- Circumference and length is the same as real arm.
- Nice form. The hand is in proportion.
- Suitable rim of stump and reasonable inclination.
- Good and smooth rivets, not to cause any rubbing on the stump.

* Note: there is a lack of weight figures.

d. Check prosthesis when patient uses it : 40 marks

- The checking procedures are the same as in BE device procedures

IV. Hip-Knee-Ankle-Foot-Orthosis (HKAFO) and thermoplastic braces.

- The structure is firm and suitable to pathology of doctor's recommendations.
- All figures of brace must satisfy the design and measurements of patient.
- Braces fit the leg, fulcrum is fitted properly and the attachments are not loose.
- Bolt is riveted (interior is flush fitting, and outside is riveted.) There are enough rivets must be firm and in the proper place and of exact width and thickness.
- Material of brace chosen must be suitable for age of patient
- If using thermoplastic brace is correspond thickness and durability and smooth. The rim must be accurate.

- **Check thermoplastic brace when patient uses it**

- When patient uses the metal brace or thermoplastic brace, it must comply with doctor's recommendations or quality control team's decision ?
- Are fulcrums and correction, rim accurate and suitable to pathology ?
- Did patient feel pain when used to stand and walk? does it fit the patient ?
- Is alignment correct and brace fit for the disable leg ?
- Are string and correction string durable, fit for disable leg and easily used ?
- Did the patient feel uncomfortable, any skin discoloration when patient wear ?

V. Shoes : 60 marks.

- Is size of shoe in accordance with the doctor's recommendation and patient pathology ?
- Is correction heel of accurate height ?
- Bolts are not wrinkled up.
- Sewing line is regular and reasonable spaced.
- Toe-cap of the shoe is proportional and not uneven.
- Hammered parts must be smooth and not stretched.

- Eyelet for shoe- lace are similar and fixed tight.
- Polished.

- **Check shoes when patients use it :** 40 marks

- Did it fit patient ? (neither loose nor tight.)
- Are the legs of same height when shoes are worn?
- Did patient feel comfortable (high correction)
- Is there any blistering or skin discoloration on the feet when the shoes are removed ?

Vinh 12 April 1992.