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Diabetic foot syndrome - part 1

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This article is the first in a series on diabetic foot syndrome. Part 1 is a general introduction to the condition.

Worldwide, more than 158 million people are suffering from Diabetes Mellitus (DM), potentially a very disabling disease. A long-term complication of DM is "diabetic foot syndrome". Diabetic foot syndrome can be described as a group of foot abnormalities, resulting from factors such as neuropathy (which refers to diseased peripheral nerves) or macroangiopathy (a process by which fat and blood clots stick to the walls of large blood vessels and block the flow of blood). Complications or consequences of other metabolic disorders can also be involved in the development of diabetic foot syndrome. Neuropathy, especially polyneuropathy, a condition where nerve damage starts in both feet, is a major cause of complications. Polyneuropathy is present in almost 85% of all patients with diabetic foot syndrome.

A very important clinical sign of diabetic foot syndrome is the diabetic foot ulcer (Fig. 1), which is sometimes followed by amputation. Diabetic foot ulcers affect 20% of all individuals with diabetes at least once in their lifetime. In Europe, 50 to 60% of all amputations are due to DM. (For non-industrial countries, this percentage is unknown.) Diabetes is a major burden, both on the patient and on the health care system. The risk of amputation is a life-long threat to the DM patient, and the costs of diabetic ulcers and amputations are high.

Fig. 1: Examples of plantar ulcers.

Frequent assessment of risk factors such as neuropathy, foot deformity, history of ulceration and quality of blood flow (which may be measured using techniques such as angiography) is necessary for early detection of patients at risk. This can then be followed by strict diabetes regulation as well as patient education about foot care and appropriate footwear. The same measures should also be taken in the case of patients with Hansen's disease (leprosy). These measures can reduce or even prevent amputations resulting from diabetic foot syndrome. With specialized teams (Fig. 2), it should be possible to reduce the number of amputations by 50%. This is also the goal of the St. Vincent declaration (1989): a 50% reduction in amputations for diabetic patients.

Fig 2: A strong clinical team is a key to better outcomes.

In multidisciplinary care for the diabetic foot, one physician with a special interest in the diabetic foot should have the lead. Where possible, the physician for rehabilitation medicine has an important and complementary role. His or her field of expertise includes having specific knowledge of foot disorders and underlying causes, adaptation to foot disorders and the consequences on daily activities, participation in society, and quality of life. The increase in the number of patients with DM and secondary foot complications requires organization of screening and prevention programs, and revised foot prescribing procedures.

Diabetic foot syndrome is an important challenge for all of us! Patient care can be improved by using a multidisciplinary approach, and by offering attention to the consequences of diabetic foot syndrome on daily functioning and quality of life.

In part 2 of this series, the focus will be on the prevention and treatment of the diabetic foot syndrome.

Bibliography

JWG Meijer. The Diabetic Foot Syndrome. Diagnosis and Consequences. Thesis, Rijksuniversiteit Groningen, 2002.

American Diabetes Association, American Academy of Neurology. Report and recommendations of the San Antonio Conference on Diabetic neuropathy (Consensus Statement). Diabetes Care 1988; 11: 592-7.

NGOs, PVOs and GOs: request to register

International Society for Prosthetics and Orthotics (ISPO)

ISPO has over the years worked with issues related to prosthetics and orthotics service provision in the developing world, or maybe better-termed, low-income countries. ISPO is in Special Consultative Status with the Economic and Social Council of the United Nations and in Official Relations with the World Health Organisation. ISPO acts as an advisory body on a non-profit basis, and is not, and has no intention of being involved in project management or component manufacturing.

ISPO has significant influence on the drafting of education packages and has assisted in defining categorisations of P&O professionals; now adopted by the World Health Organisation. Further, ISPO has, with financial support from USAID, conducted a conference on Appropriate Prosthetic Technology for Developing Countries in Cambodia in June, 1995; and an update conference on Prosthetic and Orthotic Technology for Low-Income Countries in Tanzania in September, 2000. ISPO advises - acting through its advisors - on education and technology to optimise the quality of the services provided to the beneficiaries, and has in this respect carried out two clinical field studies; one on polypropylene technology for trans-tibial amputations, according to ICRC, and another on Blatchford's ATLAS technology.

At this point, ISPO has received major grants from the Leahy War Victims Fund of USAID to be utilised on a multifaceted program on appropriate prosthetic and orthotic technology for low-income countries. This contains elements from comprehensive laboratory and clinical field testing on prosthetic feet for the developing world and over-drafting of protocols for project assessment to analyses of the training, the capacity of personnel involved in the provision of P/O services and the promotion of Community-Based Rehabilitation activities.

A crucial aspect of ISPO's work is to obtain adequate and precise information and knowledge about the work in the field of P&O by non-governmental organisations (NGOs), private voluntary organisations (PVOs), and government organisations (GOs), so that a comprehensive database of agencies and projects can be created for ISPO purposes.

The database will serve to provide statistical information to agencies regarding technologies utilised in a geographical area, education of personnel and needs for upgrading and assessment.

We need YOUR help to create a comprehensive and detailed database. If you are an NGO, PVO or GO, we kindly ask you to contact us to register. We will send you a questionnaire to fill out - one per project - and ask you to return it at your earliest convenience by fax; +45 3920 7501, or by electronic means to e-mail: ispo@ispo.ws, to the attention of Ms Anette Jorgensen. Please note: with regards to fabrication numbers, approximations will suffice.

Should you need clarification on certain points or have any questions please contact Dr Steen Jensen, Honorary Treasurer of ISPO.

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THANK YOU FOR YOUR CO-OPERATION!

Course & conference listing

Orthotics & Prosthetics Society of India (OPSI) National Conference 2004
23-25 January 2004, Bhubaneswar, Orissa, India
A.N. Nanda (e-mail: nirtar@ori.nic.in)

ISPO - Cerebral Palsy course
18-20, May 2004 (to be confirmed)
Santiago, Chile
David Condie (e-mail: condie@benassynt.freeserve.co.uk)

8th European Congress of Research in Rehabilitation
13-17 June 2004
Ljublana, Slovenia
Crt Marincek (e-mail: crt.marincek@mail.ir-rs.si)

ISPO 11th World Congress: "Innovations for Quality Living"
1-6 August 2004
Hong Kong, China
Congress Organizing Committee
(e-mail: ispo@pctourshk.com)

ISPO - Cerebral Palsy course
6 - 11 September 2004
Moshi, Tanzania
David Condie (e-mail: condie@benassynt.freeserve.co.uk)

VI Brazilian Congress of Technical Orthopedic
I IBERO American Congress of Technical Orthopedic
I ISPO Brazilian Congress
21 - 24 September, 2004
Rio de Janeiro, Brazil,
Ana Claudia A. C. Freitas (e-mail: acacfreitas@uol.com.br)
Organization Commission

Prosthetics and orthotics training in Cambodia

Sisary Kheng, Senior Lecturer Counterpart, CSPO

The profession of prosthetics and orthotics is quite new to Cambodia. In general, the Cambodian people (while being familiar with medical training and nursing education) are unaware of the field of prosthetics and orthotics, and are surprised to hear that work is being done in the field of artificial limbs and braces.

In 1994 the Cambodian School of Prosthetics and Orthotics (CSPO) was established (as a result of the collaborative efforts of many non-government organizations and sponsors) to train professionals in the field of prosthetics and orthotics. Since 1999, CSPO has been recognized as a Category II school by the International Society of Prosthetics and Orthotics (ISPO). In 2002, the school received ISO accreditation as the first non-profit organization with an ISO 9001-2000 certificate. CSPO was re-examined in 2002 and has been certified for an additional 3 years.

CSPO has provided training in prosthetics and orthotics to 68 graduates, 16 women among these. On October 1st, 2003, 8 students graduated from CSPO. One was Khmer (native to Cambodia), two were from Myanmar and the rest were from Laos. These graduates included two females, as well as a person with a disabilities. In addition to those graduating, there are currently 36 undergraduate students in the program. These students come from Cambodia, as well as from other countries in the region, such as Laos, Myanmar, Sri Lanka, East Timor, and Afghanistan. The mix of students include students with disabilities, as well as female students. We expect to have more students from other countries in the future.

CSPO has acted as a role model in the educational field by providing professional training to people with disabilities and women. By including these students in our program, we are hoping to make a positive impact on the discrimination of women and of people with disability in Cambodian society, as well as fulfill the needs of our female patients in the region.

Recently a number of CSPO staff have obtained Lead Auditor qualification from the ISO 9001:2000 series. This will benefit CSPO through the concept of continual improvement, with an emphasis on a "customer satisfaction" approach. CSPO is the only training institute in the country with ISO 9001:2000 accreditation. ISO achievement helps the school to focus more on the fulfillment of the customers (students) needs. It also encourages continual improvement through understanding the requirement of the customers, as well as taking corrective action and preventive action. For example, the school conducts a regular student satisfaction survey to find out the quality of the lecturing staff, quality of the course implementation, etc. Using this feedback, the school developed an in-house training program for the lecture staff to improve the quality of course development and implementation.

In May 2003, one of the Cambodian Orthopaedic Technologists from CSPO was offered a job with Motivation (a British charity providing humanitarian prosthetic and orthotic services to people with disabilities) in Tangale, Sri Lanka. Mr. Bo Kimsong, former Assistant Lecturer of CSPO recently accepted a position as an Orthopaedic Techologist. It is a great opportunity to prove the competency of Cambodian professionals, and will allow him to build on his base of knowledge by providing him with a variety of experiences in the field of rehabilitation. We hope that he can pass along the experience and knowledge he developed in Cambodia to other professionals in Sri Lanka, as well as learn from them, in order to raise the level of professional competence to the mutual benefit of all.

There is now funding available for 2 Cambodian graduates from CSPO to upgrade to an ISPO Category I level by studying in Tanzania beginning in September, 2003. The course will take 3 years of full-time studies to complete. The successful candidates will return to Cambodia as lecturers for the school.

For further information, contact:

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Phnom Penh, Cambodia

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Photographs are courtesy of Gordon K . Ruder.

ISPO activities

This article is the beginning of a regular section in OrthoLetter outlining some of the more interesting issues and events occuring within ISPO. The focus of the section will be to report separately on activities of the International Committee and the National Member Societies or Regions.

International committee

Category II activities

Jordan
ISPO had collaborated and was directly involved in the Category II program in Amman, Jordan run by the Al Hussein Society (AHS). ISPO was involved throughout the delivery of this program leading up to Category II examination for a single group of trainees. ISPO assisted in setting up and was directly involved in the final examination that took place in March 2003. All candidates were successful during the exam process and in turn were awarded Category II certificates. Congratulations to all the candidates!

Togo & Morocco
ISPO has collaborated and been involved in the Category II programs in Lomé, Togo and Marrakech, Morocco. Both schools are scheduled to go through the ISPO inspection process and final examinations in June and July, 2004.

University Don Bosco (UDB) Distance Learning Program

The UDB Distance Learning Program has now taken in its third group of students for their distance learning program. The first intake of students are scheduled to finish the complete program in October 2004. At that time, this group of students will have completed a two year program consisting of five modules allowing them to sit final theoretical and practical exams at the University Don Bosco. This first intake has 29 students from Mexico, South America, and Central America. The course had been translated into Portuguese and there were 22 students taking this course in Brazil in the second intake in July 2003. ISPO is evaluating and observing the program throughout, as it is foreseen successful candidates will be granted an ISPO Category II certificate. For further information please visit the website - **www.ortoedu.com**

Tanzanian/Kenyan/Ugandan cooperation

In 2003 there was joint meeting between the Kenya Medical Training College (KMTC) and TATCOT aimed at future collaboration. Harold Shangali (ISPO President-elect) had arranged a further meeting in Uganda involving the Ugandan school. Since the programs in the region had been running for some time it is felt there may be a way to harmonise programs in East Africa. It was felt that the formation of an East African Association for prosthetics and orthotics could be an outcome of the meetings. There will be a further report on this in the next issue of OrthoLetter.

WHO consultation

A 1989 document produced from a meeting in Alexandria, Egypt as a result of an ISPO/WHO collaboration was reviewed at a meeting that occured at the University of Strathclyde in September 2003. This 1989 document titled, "Guidelines for training personnel in developing countries in prosthetics and orthotics", set the stage for the acceptance of the current ISPO categorisation of prosthetic and orthotic practitioners and their definitions. The meeting encompassed a number of presentations on identified issues in the document to lead to a revised version of this report. The meeting had 24 attendees. The meeting, in its deliberations, considered issues such as single discipline courses, modular courses, distance learning courses, ISPO recognition and CBR. The outcome of this activity will be reported on in a future issue of OrthoLetter.

Category I activities

School Meeting
ISPO has a European school meeting planned from March 31st to April 3rd, 2004. It will take place at Bundesfachschule für Orthopädie – Technik (BUFA), Dortmund, Germany. The conference aims are to define professional competencies for a clinician working in prosthetics and orthotics and also to develop quality standards of education in Europe. Each participating school is invited to complete a conference survey which aims to review the professional profile of clinicians in each country. It also aims to describe existing educational models across the continent.

ISPO courses

Management of poliomyelitis

ISPO ran a successful course on poliomyelitis in Lomé, Togo from January 19th to 24th, 2004. About 40 orthopaedic technicians and therapists from six African countries took part in the course.

Orthotic management of cerebral palsy

This instructional course occurred from December 1st to 10th in Hanoi, Vietnam. More than 200 delegates attended and were comprised equally of doctors, therapists and orthopaedic technologists. The initial response from the local organisers was very favourable.

The next cerebral palsy course is scheduled to run in Moshi, Tanzania from September 6th to 11th, 2004.

ISPO regional reports

Central and Eastern Europe

ISPO members from Slovenia, Croatia and Serbia have been actively involved in negotiations with their respective governments. Slovenia has received financial support from the Ministry of Education and Science for a 3-year research project about the potential benefits of CAD-CAM use in national P&O services. Meanwhile, both Croatia and Serbia have been actively negotiating with their respective governments to secure health insurance payment for prostheses and orthoses.

A large number of conferences and educational initiatives have also been taking place in Central and Eastern Europe. The 3rd ISPO Central and Eastern European Conference was held in Dubrovnik from October 23-25, 2002. In Prague, the 2nd World Congress of the International Society of Physical and Rehabilitation Medicine was held successfully in May of 2003 and attended by almost 3000 participants. One month later, the XV International Interbor Congress was held in Budapest, which focused on classification, nomenclature, cost and copy-right of P&O devices.

Central and South America

Communication between Spanish speaking P&O professionals has dramatically improved due to two discussion forums on the Internet. One is coordinated by Alberto Castillo of the Mexican O&P society, while the other was established by the Latin-American Orthotists and Prosthetists Union. These forums allow Latin-American professionals from different disciplines to share ideas and present papers.

In education, the P&O school at the Universidad de San Martin in Buenos Aires, Argentina is attempting to improve their curriculum in order to achieve ISPO categorisation. Meanwhile, another school for O&P training was opened at the Universidad de las Américas in Panama City, though there is concern from ISPO Panama that there will be difficulty filling teaching positions.

Many successful conferences were held this past year in Latin America. The Mexican Bar for the Certification of Orthotics and Prosthetics (BAMCOP) held a course for orthotists and prosthetists from April 30 to May 2 in Acapulco. A seminar on rehabilitation and O&P for the lower limb was held by Becker and Ohio Willow Woods in Quito, Ecuador from June 4-6. Orthotists, prosthetists, physiatrists, orthopaedic surgeons and health administrators from 14 Latin American countries were in attendance. The conference was a success with the added benefit of Ecuador, Peru, and Venezuela expressing interest in forming new ISPO National Member Societies. Mexico held the IV International Meeting for Orthoprosthetic Centres from June 18-21, which was attended by over 1200 people. From October 20-23, Argentina hosted the IV Latinamerican ISPO Congress. A report of this meeting will appear in the June 2004 issue of Ortholetter.

South Pacific

The Australian National Member Society (ANMS) has recently completed an on-site mentoring education project in the Marshall Islands. The Outreach Committee of the ANMS was approached by the Majuro Hospital in the Republic of the Marshall Islands to provide orthotics training to their Category II prosthetist, Mr. Hemos George, who was trained in Brazil. There is a great need for orthotics services in the region, largely due to the high incidence of diabetes mellitus. Ms. Leigh Taylor, an orthotist from the Crippled Children's Association in South Australia, was selected to visit the Marshall Islands for two months to provide this orthotics training. Multiple lower limb orthotic devices were fit and the skills of local rehabilitation professionals were improved. This project was co-ordinated by Wes Pryor, the Secretary of ISPO Australia, and funded by AESOP Business Volunteers Ltd.

Another ongoing project in the region is the construction of a rehabilitation centre in Tarawa, Kiribati, to be funded by the Canada Fund. This project is currently being evaluated by the Kiribati Government.

Roto-molded plastic prosthetic components

The development of a simple, tough, and low-cost technology

Rob Buchanan, MEND Trust, New Zealand
In cooperation with Green Pastures Hospital and Rehabilitation Centre, Nepal

Introduction

Living in more remote locations with a lower limb amputation is a challenge. A suitable prosthesis requires a combination of properties. It has to be cheap, strong, simple and waterproof. Experience has shown that an exoskeleton design is preferable in these conditions.

Mobility Equipment for Needs of Disabled Trust (MEND) is in the process of developing a low cost, simple prosthetic solution that stands up to the demands seen mainly in low income countries. The technique used has been called "Roto-Molded" and MEND has also used this technique in making low-cost Roto-Molded wheelchairs.

Currently MEND and it's partner in Nepal (Green Pasture Hospital and Rehabilitation Centre) are testing prototypes of components of this design.Green Pasturs has also been experimenting with designs from plastic (high density polyethylene) drainpipe, which may be reported on in a future issue of OrthoLetter.

The technique

Molds are first prepared locally using sheet metal or aluminum (Fig 1). A weighted quantity of polyethylene powder is then put into the molds and heated at a constant temperature of 270 degrees centigrade. The mold is rotated slowly, making sure the melted plastic is evenly distributed. By adding increasing amounts of powder the wall thickness can be regulated. The product is formed by the melted plastic running over the INTERIOR surface of the mold and is therefore hollow.

Fig 1: Molds on the left with prototypes shown on the right.

Costs

1. A mold for a complete upper and lower plastic limb uses approximately $15USD of sheet metal 1.6mm thick (or 5" / 6" diameter steel pipe with 1.6mm wall) and takes about 8 hours per mold to make using simple tools such as a welder, bender and press.
2. Each prostheses consumes about 1.2 kg of plastic powder (giving a 3mm wall thickness) and costs about $2.50USD per kg for first grade quality, or $1.50USD per kg for second grade quality, which is adequately strong. A metal tube insert at the knee joint and nylon bushings cost $1 USD. Total manufacture cost is around $4 USD including gas heating. This does not include labour costs.

Cooking

1. The metal mold with powder inserted is cooked for about 25 minutes in a gas-fired oven, or using several gas burners underneath.
2. Metal bearing tubes at the knee joint are inserted into the mold BEFORE molding and become an integral part of the finished product. This allows for replacement of knee axis bushings.
3. Any shape or size prosthesis can be designed as long as it can be released from the metal mold.

Colours

Skin colour can be matched perfectly to include freckles and spots by addition of some black or brown powder.

Fitting

At the moment, in order to achieve a good fit of the socket, it is important that traditional cast modifications be done. In the future, there is potential to reduce the costs and time of the pocesss by eliminating the need to take plaster casts. This may be accomplished by using a heat-resistant sock over which an extra thin plastic is molded. This thin liner could then be welded to the outer roto-molded section of the prosthesis.

Fig 2: Roto-molded prostheses with HDPE sockets in Nepal.

Testing

The first prototypes of the plastic limbs are being tested in Green Pastures Hospital, Pokhara, Nepal (Fig. 2).

The advantages seen to date are the low weight of the material, the exoskeletal design and the possibilities of different colors. There has been postive feedback from one wearer who remarked, very positively, on the cosmetic value of the prosthesis. Overall it seems the material and technique is strong and rigid enough for use in a transfemoral (above-knee) prosthesis.

Some of the design improvements suggested include increasing the number of degrees available for flexion in the knee, the addition of a locking system for the knee and improving the elastic strap used for the extension assist. Improvements are still needed in the welding and molding processes.

If any of our readers are interested in testing this system, MEND is interested in developing this technique further with other organisations. Please contact Rob Buchanan at the following:

Mobility Equipment for Needs of Disabled Trust (MEND)
P.0 Box 94, Keri Keri, Northland, New Zealand
email address - mend@xtra.co.nz
website - www.saritaksu.com/med

Meeting post-conflict needs:

Education and training in ICRC-assisted prosthetics & orthotics programs

Part 2: Certificate of Professional Competency (CPC)

Theo Verhoeff, Physiotherapist, MPH; Claude Tardif, Orthotist-

This article is the second of a series dedicated to education and training in ICRC-assisted O & P programs.

Since 1979 the International Committee of the Red Cross (ICRC), through its Physical Rehabilitation Programme (PRP), has become increasingly involved in setting up and running physical rehabilitation centres around the world. Over the years, the ICRC has assisted more than 70 centres in over 30 countries, the primary aim being to provide appropriate and quality physical rehabilitation services. Another important aim is to ensure that the centres will continue to provide services of the same quality after the ICRC withdraws its assistance, since the patients being treated there have permanent disabilities (amputated limbs) and will need access to these services for the rest of their lives. With the experience gained over the past 25 years, the PRP has identified three factors helpful for a project's sustainability. First of all, the centres must be functionally and administratively independent. To address this issue, the ICRC has drawn up standard protocols for managing physical rehabilitation centres in various contexts. Secondly, the raw materials and components used for manufacturing prosthetic and orthotic devices must be cheap, of high quality and easily available. To meet this need, the ICRC has developed a polypropylene-based technology that has been well accepted throughout the world. This acceptance has not only occured within ICRC-assisted projects, but also by other organizations, local partners and, most importantly, by patients. Finally, the national staff of these centres must receive appropriate training (as defined under the ISPO categorisation system). To ensure that formally trained staff is available, the ICRC sponsors the training of candidates in nationally and internationally recognized prosthetic and orthotic schools. For situations where this approach is not suitable, however, the ICRC has developed an alternative training package leading to a Certificate of Professional Competency (CPC).

Fig 1: Ethiopian students casting patients at new centre.

The CPC training program is based on three principles:

- The training provided must conform to the ISPO professional profile for Category II (Orthopaedic Technologist) so as to guarantee a suitable professional level and possible international recognition.
- Students must be able to continue to provide services during training and produce a minimum number of prosthetic and orthotic devices.
- The program must be flexible. The learning objectives, the course content, the number of hours allocated to each course, the minimum conditions for starting up the program and the procedures set out in this package cannot be altered. However, implementation of the program can be adapted to each situation.

The aims of the CPC training program are to:

- Give professionals the knowledge and skills they need to practice prosthetics and orthotics in accordance with international or national professionally accepted standards.
- Improve patient care.
- Work for the long-term sustainability of prosthetic and orthotic services.
- Foster a rehabilitation team approach (relationship with other professionals).
- Further the development of leaders/managers/teachers.
- Promote and build up the profession, and facilitate the development of national standards.

The complete CPC training program includes 4 modules:

- Module 1: Lower Limb Prosthetics
- Module 2: Lower Limb Orthotics
- Module 3: Upper Limb Prosthetics & Orthotics and Spinal Orthotics
- Module 4: Clinical Procedures

The package developed for the CPC comprises the learning objectives of the complete training program (the four modules), the learning objectives of each module (since each module can be implemented individually), the syllabus for each module (including the hours allocated to each course and the content of the courses) and the protocols for implementing and running the program.

Distribution for each module (in hours)

	Module 1	Module 2	Module 3	Module 4
Academic Teaching (theory)	824 hours Common Trunk[1]: 652 Specific Courses: 172	859 hours Common Trunk: 652 Specific Courses: 207	794 hours Common Trunk: 652 Specific Courses: 142	326 hours
Practical Teaching (practice)	1400 hours Common Trunk: 100 Specific Courses: 1300	1400 hours Common Trunk: 100 Specific Courses: 1300	1400 hours Common Trunk: 100 Specific Courses: 1300	1000 hours
TOTAL HOURS	2224	2259	2194	1326
% THEORY	37%	38%	36%	25%
% PRACTICE	63%	62%	64%	75%

[1] Common trunk course are basic courses which are common to the first 3 modules

Syllabus

(Section in gray contains the common trunk courses)

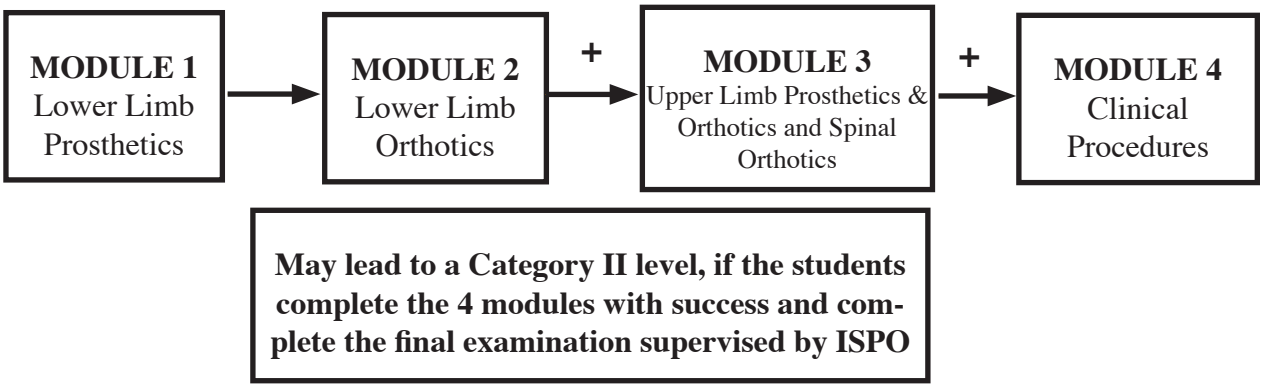
Courses	Module 1 Lower Limb Prosthetics	Module 2 Lower Limb Orthotics	Module 3 Upper Limb P&O and Spinal Orthotics	Module 4 Clinical Procedures	TOTAL
Theory					
Anatomy / Physiology	92	92	92	46	138
Material Technology	92	92	92		92
Mathematics	92	92	92		92
Mechanics	92	92	92		92
Workshop Technology	38	38	38		38
Workshop & Business Management	46	46	46	46	92
Applied P&O Biomechanics	92	92	92		92
Psychology	10	10	10	26	36
Ethics	10	10	10		10
Communication	18	18	18	30	48
Pathology	70	70	70	40	110
P&O Science	160	187	120		467
Clinical Methods	12	20	22	138	192
Practical					
Workshop Technology	100	100	100	0	100
P&O Science	1300	1300	1300	1000	4900

Flexibility in the implementation of the CPC Modules

The complete training program involves a sequence of four CPC modules (plus options) designed to ensure that the skills of trained persons will be at Category II level. Ideally, students should not have to continue providing services during training so that they have time to assimilate what they have learned. Since this will be impossible in most situations, a good balance should be struck between service provision and training. To ensure proper integration of knowledge, the students are closely supervised by the teachers (one teacher for six students). In addition, they are provided with carefully selected patients.

Fig 2: Patients are selected to be part of the practical training.

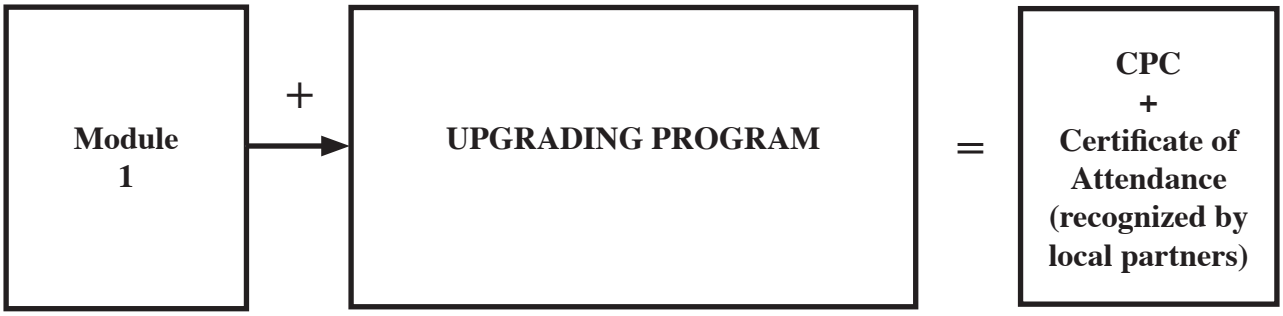
Complete training flow of modules



The modules can be implemented in any particular sequence according to specific needs. Except for module 4, which reinforces the knowledge and skills acquired in the first three modules, each module can also be implemented alone. Whatever path chosen (one module, two modules, etc.), each module will lead to the CPC level diploma, provided the students pass the final examination.

In cases where module 4 is not implemented but students will be asked to take on greater management and clinical responsibilities upon graduation, it is possible to supplement the training received with some module 4 courses providing greater knowledge and skills.

CPC training programs can be flexible and adapted to specific situations



As shown by the above examples, the CPC training program is flexible and can be adapted to specific contexts. However, to ensure that the level of training provided meets ISPO Category II standards, it is important to observe the following rules:

- If all four modules are implemented, and if the aim is to obtain ISPO recognition, ISPO will need to be contacted before the training is given to ensure that that it fully conforms to the guidelines.
- Module 4 cannot be implemented before completion of Modules 1, 2 and 3.
- For recognition of common-core courses, a maximum of three years is allowed between the modules.
- Students who have only completed one module are encouraged to take part in an upgrading program including part of the course content of Module 4 so as to further develop their potential and ensure that they can provide better services and take on greater responsibilities.

Minimum conditions for starting up the program

To ensure proper implementation of the training program, the following minimum conditions must be met by the ICRC and its local partner before the program can begin.

Conditions to be met by the ICRC

- Provide expatriate teachers (one teacher for six students).
- Provide teaching resources (books, manuals, etc.).

Conditions to be met by the local partner (usually Ministry of Health and/or Social Affairs)

- Ensure that the training is recognized by the other ministries and institutions concerned.
- Recognize the prosthetic and orthotic profession at the appropriate level of public servant categories.
- Guarantee that the students will be hired by national physical rehabilitation centres after graduation.
- Provide the facilities in which the training will be carried out.

Conditions to be met by the local partner and the ICRC

- Make sure that there are enough candidates with the educational background needed for enrolment in the program (see Regulations).
- Identify and assess the national resources available for the program (technical school/medical school/university teachers, teaching materials and resources, translators and support staff).
- Develop and approve the Training Program Protocol, which sets out the criteria and procedures for selecting students and teachers, the rules and procedures for ongoing and final examinations, the role and responsibilities of the Board of Studies, the course structure, etc.
- Provide on the premises the machinery, equipment and material and components needed for the program.

Teaching Materials

As part of the CPC training package, the ICRC has begun to produce training manuals. The Lower-Limb Prosthetics Manual and the Upper-Limb Prosthetics Manual are currently under revision and the Lower-Limb Orthotics Manual should be ready for revision at the beginning of 2004.

Final comments

While the ICRC prefers to sponsor the training of students in recognized prosthetic and orthotic schools whenever this is possible, the CPC Training Program offers a good alternative when it is not. It should be remembered that the CPC was developed in close cooperation with ISPO on the basis of the ISPO Category II Information Package. A CPC course is currently being conducted in Addis Ababa in close cooperation with the Ethiopian

Fig 3: Facilities where the teaching program is occuring.

Comments / feedback from the readers

Professionalism through continuing education

That knowledge is power, and power is today's survival tool, is as true today as it was during the Hippocratic times! Nevertheless, discoveries are often made not by following instructions, but by deviating from the main concept and trying the untried.

Life is full of opportunities for doing good; we need to create some good ourselves in prosthetics and orthotics. One way we can do this is through further educating ourselves as professionals. An upgrading course is not good enough if new techniques or ideas are not being utilized. The significant problems we face cannot be solved if we do not find ways to advance ourselves.

The most uncomfortable truth that still lingers on in prosthetics and orthotics is dependency on administration and management. The long-term future of our profession should not rest in the hands of these professionals, but in the hands of the practitioners and technologists themselves. To continue as a strong profession what is needed now is flexibility, timely innovations, and visionary education and practice. Each patient should experience a good comprehensive treatment and be able to report this back to their peers as well as to other health care professionals.

Prosthetics and orthotics in the developing world requires a strong and healthy attitude, a clear approach to service, and involvement in the daily practice of "hospital medicine" in order to render quality rehabilitation services to the physically disabled. It is my feeling that quality (higher and advanced) education is of great importance towards the recognition and appreciation of this distinct specialty in the future.

Thomas Iwalla, Kenya

Message to the editor of ORTHOLETTER

I would like to congratulate all the OrthoLetter team for the effort provided in order to announce to us the new technologies in Prosthetics and Orthotics and the work of others in this sector. I would also like to make a clarification related to the OrthoLetter issue of December 2002. On the pages 8 and 9 of the mentioned issue, all what is said is true but Mr. Sepp Heim made a mistake of the name of the initiator or the founder of the workshop in northern Togo. The initiator is not Nyavo Dotsi but AFETSE Atsu who finished school in 1994.

Today the centre is named ACTIVA SANTE MICKIEFFER and features beside the orthopaedic workshop a re-education and massage area. The pictures below show the oven does not function any more with charcoal but now uses gas.

Cordially yours,
Afetse Atsu, TOGO

Trans-tibial alignment

Static alignment

Noelle Lannon, Canada

This article is the second in a series on prosthetic alignment

The previous article on alignment discussed how to properly "bench align" a typical trans-tibial prosthesis. Once bench alignment is complete, the prosthesis must be aligned to the patient statically (when the patient is standing, therefore not moving), and dynamically (during gait). The alignment of the prosthesis statically and dynamically should be done at the time the prosthesis is initially fit to the patient. Good bench alignment alone does not guarantee the patient efficiency and/or comfort during gait, but provides a good starting point from which to proceed. Proper bench alignment also means fewer changes to the prosthesis when initially aligned to the patient, because the "standard" bench alignment takes into account many factors mentioned below.

Static alignment

Static alignment is the preliminary alignment of a prosthesis based on observation of the amputee as he stands between parallel bars and shifts his weight to distribute it evenly between the prosthesis and sound leg. The goal during the static alignment procedure is to place the socket in an optimum position in relation to the prosthetic foot at normal stance. Keep in mind the amputee will be expected to walk with a flexed knee, with weight borne over the middle third of the foot in mid-stance.

Align the prosthesis to the shoe

Before doing anything else, check the bench alignment one more time, this time with the prosthestic foot inside the patient's shoe (Fig. 1) or sandal (if applicable). Make sure you have still achieved your standard bench alignment, by adding heel wedges if necessary to ensure the prosthesis is in a neutral position. A laser pointer or plumb bob can be used to ensure your alignment is correct (for correct bench alignment please refer to OrthoLetter issue number 12 - July 2003).

Fig. 1: Prosthesis properly aligned in a patient's shoe.

Inspect the stump

Once you feel confident that the alignment of the prosthesis in the shoe matches the bench alignment of the prosthesis, visually inspect the patient's entire body, taking into consideration factors such as blindness, partial paralysis, etc. These factors are important to note before moving on. Visually inspect the stump noting colour, shape, skin integrity, grafting, scarring, and the presence or absence of hair (this is important as it indicates the quality of blood flow or circulation to the area). Palpate (touch) the entire stump noting edema or swelling, tenderness, texture, and temperature (if the skin is rough, dry, callused, or inflamed). It is important to be aware of the condition of the stump prior to fitting the prosthesis, so any changes in condition can be noted.

Apply the prosthesis

Apply a prosthetic sock to the stump (apply as many socks as you expect the socket will fit properly with). The prosthetic socket should be examined to ensure there are no foreign objects inside (such as screws, etc.), and all fasteners should be checked for safe use

The socket should be donned with the patient seated, and the knee flexed at forty five degrees (Fig. 2). As the socket is applied, note how easily it goes on to the residuum. If it is too tight or too loose, change the number of socks as necessary. Tactile feedback is important, place the socket on yourself so that you as the clinician may assess volume. If a patient has never worn a prosthesis in the past, he/she may not know how tightly or loosely to expect the socket to fit.

Fig. 2: Prosthetist applying the prosthesis to patient.

The patient should next be instructed to stand upright between the parallel bars, supporting most of his/her weight on the bars and through their sound side, not on the prosthesis. Once the patient is upright, allow them to put some weight through the prosthesis until they are standing evenly on both feet.

Socket fit

Once the patient is standing, socket fit should be assessed (Fig 3). The socket is designed for comfort, function, and appearance. All three of these factors are important, the first two more so than the third. The function of the socket should be to allow direct transference between the stump and prosthesis, so that the amputee has optimal control and efficient use of their prosthesis. The socket should also provide accurate control of soft tissue from a hydrostatic point of view.

Fig. 3: Check the fit of the socket with the patient standing.

On a normal patient, the socket can push firmly on the popliteal fossa, lateral musculature, area under the patellar tendon, and the medial aspect of the tibia. Areas that will not tolerate pressure from the socket include the head of the fibula, the distal (cut end) of the tibia, and the crest of the tibia. Socket fit should be assessed to ensure the patella is positioned properly, and to be certain only those areas that are tolerant to pressure (as mentioned above) are subjected to it. Also examine the socket's trim-lines, to ensure the patient can properly flex and extend the knee without discomfort. If possible, view all of the socket (if the socket is made from a clear material), to check for gapping or areas of increased pressure. If this is not possible, the proximal brim should be viewed for gapping or pressure. The patient should be advised that they should be feeling equal pressure all over the residuum, "like a good, firm handshake".

If at this time, or at any other time during the static alignment assessment the patient begins to experience discomfort, have him/her sit, remove the prosthesis, and check for pressure marks. Use the amputee's remarks as a guide, but look for stump sock impression marks, redness, or little red dots (these indicate areas of non-contact by the socket). Attempt to reproduce the patient's feelings of discomfort yourself, by pushing on or stretching the problem area on the residuum. If there is pressure in an unwanted area, lipstick may be used on the stump sock at the pressure point. Have the amputee don the prosthesis again, bearing his/her weight though it. Remove the prosthesis. A lipstick stain on the socket itself will indicate the pressure area. Ease this area out before proceeding It is important to keep in mind that a certain amount of redness is to be expected in those areas that are tolerant to pressure from the socket. This redness is normal, and should fade within approximately five to ten minutes. If redness occurs in an area that is not tolerant to pressure, or does not fade after five to ten minutes, the socket is not fitting properly and needs to be adjusted.

Length of the prosthesis

With the patient standing with equal weight on both feet, check the length of the prosthesis. This should be done with the amputee standing with equal weight on both legs, with the feet approximately ten centimeters apart at the heels. By palpating the iliac crests, it is possible to observe if the pelvis is tilted to one side or the other, indicating a leg length discrepancy (Fig. 4). Position blocks under the shorter side until the pelvis is level. These blocks can be measured to determine the exact amount the prosthesis length must be adjusted. When leg length is even, both feet should be in-line, with the prosthetic foot flat on floor. Hips should be level, and the shank of the prosthesis vertical. If one leg is shorter than the other, the patient's center of gravity shifts over the shorter leg. The patient compensates to pull the center of gravity back under their base of support by leaning over longer leg. This causes spinal curving, with the convex side of curve faces toward shorter side. If the length of the prosthesis needs to be modified, do this before proceeding.

Fig. 4: Assess the length of the prosthesis.

Angle of the foot

"Toe out", or the angle of the prosthetic foot as compared to the line of progression, should be the same as on the sound side. This should be checked, again, with equal weight applied to both the sound side and the prosthetic side (Fig. 5). Although you may find you need to correct the angle of the foot further once the patient begins to walk, it is still a good idea to correct this now.

Fig. 5: Toe out should be adjusted to match with the sound side.

Knee stability

The patient should be able to stand comfortably in his/her prosthesis, without having to actively prevent the knee from hyperextending or buckling (flexing). Check the foot or shoe to ensure the bulk of the patient's weight is balanced on the middle aspect of the foot, or slightly anteriorly. Socket tilt should be modified here if needed.

Suspension

Finally, before any walking can begin, check the suspension of the prosthesis to ensure it is adequate and all fasteners are functioning.

Keep in mind at all times during the static alignment procedure to listen to the patient. Check to make sure he/she is not getting tired, or is not uncomfortable. It is essential to complete static alignment before moving on to dynamically aligning the prosthesis.

References:

Bowker, John H. and Michael, John W. (2002) Atlas of limb prosthetics: Surgical, prosthetic, and rehabilitation principles. 2nd ed. Mosby-Year Book Inc. USA.

Fitzlaff, G., and Heim, S. (2002) Lower limb prosthetic components: Design, function and biomechanical properties. Vertlag Orthopadie-Technik, Germany.

Weber, Don, et al. (1991). Clinical aspects of lower extremity prosthetics. Elgan Enterprises, Canada.

Reilly. P., Trans-tibial alignment course notes, George Brown College, Toronto, Canada

The third article in the series on prosthetic alignment will focus on the dynamic alignment of a trans-tibial prosthesis, and will appear in the next issue of OrthoLetter.

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Questions and Answers

REMINDER!! Everyone is welcome to pose questions either from past articles or from the field in general. These questions need not be specific to any particular topics, but can cover a wide variety of subject matter. Those who have questions or inquiries are encouraged to submit them for posting. It is hoped that the readership will respond to the questions posted through a related article or a short response.

Contact information is on the back page of the newsletter.

Message from the Editor

OrthoLetter's website will be going through some major changes that will be implemented by the time you receive this issue. We are moving to a new server to allow us to put more material on the internet for you to download. Our home page will direct you to the current issue on-line and also the previous one. In addition our previous years issues will be available to download in Portable Document File (PDF) format. It will also allow us to enhance the current articles with supplemental material and more photos and digital movies.

Beginning with this issue, OrthoLetter will have a regular section outlining current ISPO activities. This section will attempt to give our readers a brief overview of various activities of the International Committee of ISPO. In this section there will also be a summary of ISPO regional reports made by the various regional consultants to ISPO. For those interested in receiving more details on any of the activities reported on, please contact us using the information displayed below. It is our hope this section will give our interested readers more details on what ISPO's current roles are and what is being accomplished by the Society.

Please continue to submit articles, comments, and feedback. We need your support!

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For a free subscription or to make submissions to ORTHOLETTER, please contact the Editor at the address below:

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