NCPO News
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NCPO Graduates First Japanese Upgrade Student

Miss Ono's graduation presentation: Left to Right: Mr Mitsuhiko Uchida, Ms Machiko Saito, Miss Akie Ono, Mr. Rod Cooper and Dr Seishi Sawamura.

A graduation event to acknowledge the first graduate of the NCPO's upgrade program, Miss Akie Ono, was held by the NCPO in January.

Miss Ono, a 2003 graduate of the prosthetics and orthotics course at Kobe College of Medical and Welfare, Japan, and licensed Japanese practitioner, completed the upgrade course at the NCPO during 2004. She becomes the first Japanese graduate to have received the La Trobe Bachelor of Prosthetics and Orthotics Degree.

Present at the ceremony with NCPO staff and students were Kobe College directors Ms Machiko Saito and Mr Mitsuhiko Uchida and honorary president of the College Dr Seishi Sawamura.

In a speech at the ceremony Miss Ono acknowledged the support of her fellow students and the assistance of NCPO staff and her home stay family during her study. Miss Ono is now applying for positions at Australian facilities.

The NCPO currently has three other Japanese graduates undertaking the upgrade course and has accepted enrolments from another four applicants to undertake the course in 2005.

NCPO Distance Education Developments

The NCPO is continuing to develop teaching materials in a diverse range of formats to both on campus and distance based students. We can offer a variety of delivery options including customised continuing education and upgrade courses to suit the needs of the recipients.

A large number of units are also available to take as stand alone subjects via distance education.

Topics include:

- Introduction to P & O clinical practice
- Patient Evaluation
- Orthotic Management of Fractures
- Independent Study Project

Specialised lectures on prosthetic and orthotic related topics, technical guides and practical teaching resources are also available.

For further information please have a look at our new distance education web page:

www.latrobe.edu.au/ncpo/docs/disted.html,

or follow the links from our home page:

www.latrobe.edu.au/ncpo.

Direct enquiries can be made to Wes Pryor on (03) 9479 5729 OR Email: **w.pryor@latrobe.edu.au**

Wes Pryor Visits India and Cambodia

International Aid Lecurer Wes Pryor recently returned from a visit to Northern India and Cambodia.

In India the NCPO was invited to discuss continuing education for prosthetics and orthotics. Wes met with a number of agencies to consider this challenge.

"P&O education in India is very strong." Said Mr. Pryor. "P&O practitioners and schools are required to register with the Rehabilitation Council of India, and must undertake fairly stringent accreditation processes." Although local training in P & O is very strong, some agencies have recognised that international collaborations and increased training, especially in research in P&O, may be highly valuable for Indian P&O professionals. "The challenge is how to best integrate the skills of Indian and Australian P&O training facilities." The NCPO and Indian professionals will continue to explore this challenge in coming months.

While in Cambodia, Mr. Pryor met with the Cambodian School of Prosthetics and Orthotics, to discuss the upgrade course to be taken by a number of CSPO graduates. "The course, which begins in January 2006, is taking shape, and we met to finalise the curriculum and address a few challenges". While in Phnom Penh, Mr. Pryor met a number of the students who will begin the course in January. "The students are from four countries with a diverse range of professional experiences. As graduates of the CSPO program, they are ISPO Cat. II accredited, and in addition must have a number of years professional experience. Their inclusion in our course will provide enormous benefits for other students. They are a very friendly and professional group of students, and will be very welcome at the NCPO and La Trobe University next year."

New Staff Members Join the NCPO

The NCPO was pleased to make several new staffing appointments to complete its staffing team for 2005.

Mr. Anthony Francis has accepted a three day per week appointment to perform the roles of NCPO clinic manager and NCPO Clinical Education Coordinator. In addition to these duties Anthony will also be involved in the teaching of the lower limb orthotics curriculum. Anthony can be contacted by phoning 9479 5864 or by email at a.francis@latrobe.edu.au

Ms. Angela Scardamaglia has accepted a role as an NCPO clinician and will combine this role with her higher degree studies in 2005. Angela will also perform the role of Australian Orthotic and Prosthetic Association Executive Officer, a contract role provided by the NCPO to the AOPA. Angela can be contacted on 9479 3525 or by email at a.scardamaglia@latrobe.edu.au

Angela and Anthony are both filling maternity roles created by the birth of Riley Gurry to proud parents Kaisha and Michael Gurry. The NCPO extends its congratulations to the Gurry's on their newest arrival.

Ms Claudia Doebrich has also joined us on a sessional basis to help teach transfemoral prosthetics.

Angela Scardamaglia

The NCPO advertises staffing vacancies as they arise and is always interested to register prospective staff members who wish to be informed of employment opportunities. Interested parties should contact NCPO Head Mr. Rod Cooper by email at rod.cooper@latrobe.edu.au and provide their curriculum vitae.

Anthony Francis

Claudia Doebrich

Curiculum Corner: Development of Writing Skills in NCPO Students

Last Summer, NCPO staff worked to clarify the writing skills required of students at each year level. The aim was to improve the general standard of student writing, facilitate skill development, promote consistency between assessors and aid provision of meaningful feedback. The new Writing Skills Definitions were implemented in 2004.

In the Definitions, acceptable standards of skill increase from a basic entry level in first year to a high standard at the end of the Honours year. La Trobe University bachelor degree graduate attributes are incorporated into the definition of satisfactory in third year, to ensure that all P&O graduates meet the degree standard for written communication. Achievement of this standard should enable a graduate to write a report of an acceptable standard for a professional audience.

Major skill sets that are developed and assessed include professional communication, location and reference to appropriate sources, information processing and demonstration of understanding. Each skill set contains various skills that result in observable characteristics in a document. Performance requirements for each skill are defined for each possible grade, ranging from unsatisfactory to A+.

At the start of each semester, students are provided with the Definitions appropriate for their year level, so they can focus their efforts to achieve the minimum writing standard or aim for a higher grade. Tutorials are offered to students to teach and facilitate writing skill development. After written work is submitted, it is assessed according to the same definitions and each student receives feedback about their own performance.

Since the introduction of the Writing Skills Definitions, NCPO staff have observed general improvements in student writing, more self-directed development of writing skills and increased motivation in some students to gain very high grades. Staff also noted that it is easier to provide detailed feedback about writing skills and report greater consistency in marking. These advantages probably reflect the clearer understanding of writing standards by students and by staff. Refinement of the Definitions will occur during 2005. More information can be gained from NCPO Lecturer Margaret Hodge, phone 03) 9479 5778, email: M.Hodge@latrobe.edu.au

Industry Collaborative Grant Assists Development of Shrinker Socks for Amputees

Amputees in Australia and overseas will benefit from a research project conducted at the NCPO to develop "shrinker socks" or compression stockings to control swelling in amputation stumps.

People with amputations below the knee often encounter volume changes in their stump which may affect the fit and function of their prosthesis. Fluid accumulates in the stump during periods when the prosthesis is not worn because of poor circulation and because the action of muscles, which normally assist fluid drainage, is reduced.

In people with intact limbs, this problem is usually managed with compression stockings which are "graduated" to provide higher pressures near the ankle and lower pressures near the thigh. This graduation counteracts the effects of gravity which makes fluid pressures in the veins and lymphatic vessels higher near the ankles. The pressures exerted by the stocking must be controlled within certain ranges: pressures too high can cause damage to the skin and underlying tissue; pressures too low are ineffective in reducing swelling.

A joint research project between Law Comfort and La Trobe University funded in part by the University's Industry Collaborative Grants Scheme promises to provide a similar graduated compression stocking for amputees. Mr Richard Law, an engineer and managing director of Law Comfort, has developed instrumentation to measure very precisely the pressures exerted by shrinker socks. Ms Lee Brentnall, a recent P&O graduate, has conducted mechanical analysis of a range of knitting samples produced by Law Comfort and has compiled a database of stump measurements from about 100 amputees. Associate Professor Tim Bach at the NCPO has performed a statistical analysis of the mechanical test results and has developed a computer simulation and sock knitting model which assists the sock design process.

Using the computer simulation, researchers can test the effects of socks which have been designed by predicting the pressures which would be exerted on stumps in the data base at any level between the end of the stump and the mid-thigh. The aim is to ensure that there is a sufficient range of sizes so that the vast majority of amputees can be safely and effectively fitted. The computer model can also be used to design custom stockings for amputees with unusually shaped stumps based on individual stump measurements.

Law Comfort is currently producing a range of shrinker socks for clinical trials early in 2005. Mr Law says that there is considerable interest in the product in the UK, Japan, Canada and the United States.

For more information on this story, please contact Associate Professor Tim Bach on 03 9479 5884 or email:

t.bach@latrobe.edu.au.

Technical and Clinical Note: Prosthetic Management of PFFD

The NCPO was approached by a client, "C" who had been born with Proximal Femoral Focal Deficiency (PFFD) of her left leg. There are 4 degrees of severity of PFFD ranging from A - least affected, to D - the most affected femur and hip (see Figure 1).

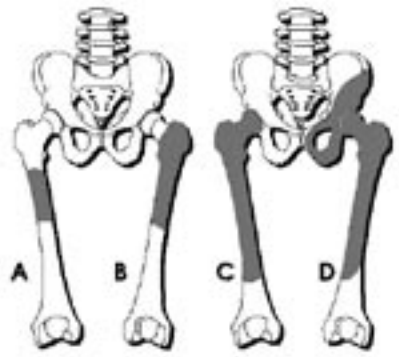

Figure 1. The Aitken levels of severity of PFFD taken from The Fetus net:- http://www.thefetus.net/page.php?id=349 (accessed 6/3/05).

Some children born with this disability are encouraged to have Van Ness tibial rotation-plasty; a surgical procedure which rotates the foot 180° allowing the ankle to flex as the knee joint. There has been a large amount of controversy about this surgical procedure. (See: http://www.ohio.net/~pffdvsg/req-pffdguide.htm#Summary).

In this case, her parents rejected rotation-plasty surgery and "C" used a stiff legged prosthesis throughout her childhood, teens and early adulthood. Later, when she was about 28 years old, she was provided with a prosthesis that had external free knee joints. This allowed her to be more active in her pursuit of a more normal life including her hobbies of bushwalking and bird-watching. She had managed well with the prosthesis using a walking stick 80% of the time.

She approached the NCPO to see if her prosthesis was providing optimal function and if an improved cosmetic appearance could be achieved.

Upon examination it was found that she had a well fitting quadrilateral socket, with numerous straps including a Silesian harness holding her into the prosthesis, a pelite lined foot shell which had minimal heel pad loading, external knee joints and a single axis foot. She used a walking stick for stability whenever walking any distance more than a few metres. She had a mobile anatomical hip/knee joint and fair mobility of her ankle (as a knee joint). She appeared to be an "Aitken C" level of PFFD (see figure 2 and 3).

Figure 2. Patient "Cs" mature X-ray of her hip joint.

Although pain free, "C" exhibited a large lateral trunk bend during prosthetic stance phase. It was believed that the quadrilateral socket she was wearing did not provide optimal stabilisation of her hip joint as there was minimal socket loading to hold the poorly formed femoral head into the acetabulum. Also the single axis foot on her prosthesis restricted medio-lateral mobility on uneven ground in activities like bushwalking. Some articles indicate that quadrilateral sockets are used for PFFD patients(R. B. DAVIS, 1988). Other problems occur for PFFD patients(Goddard, Hashemi-Nejad, & Fixsen, ; Tsirikos & Bowen, 2003).

Figure 3. Lateral View. From patient's website:- http://members.optusnet.com.au/~carikube/pffd/My%20prosthesis.htm.

A proposal was put to her prosthetic clinic in December 2003 that the stabilising features of an Ischial Containment (IC) socket would provide greater skeletal loading using a laterally directed force on the medial aspect of the ischial tuberosity and a medially directed load proximal to and below the Greater Trochanter (in the sub-trochanteric region). While the 3 point pressure system is a simplification of the direction of forces inside the socket, it does identify the main feature of this IC socket. The loading stabilised the hip/knee joints far more than a quadrilateral socket could. The special IC socket design for this case had to stabilise the hip joint femoral head into the acetabular capsule, support and stabilise the knee joint and load the lateral shaft of femur (Figure 4). This provides compression between the pelvis and the femur improving stance phase stability of the hip/knee joints. There is a dramatic difference between the socket shapes (Figures 5 & 6)

Figure 4. Ischial Containment loading for the PFFD patient applied to her X-ray. From patient's website:- http://members.optusnet.com.au/~carikube/pffd/My%20prosthesis.htm.

Loading provided from a quadrilateral socket could not stabilise her hip joint in such a manner, because the direction of loading would not facilitate pelvic/hip joint compression and has caused the patient to adopt an abducted stance to improve hip joint stability (see figures 7 and 8). A more mobile multiaxial foot would allow her to participate more easily in the bushwalking activities that she enjoyed. No change to the external knee joints was required. Great care had to be taken in fitting

Figure 5. Top view of quadrilateral socket.

Figure 6. Top view of Ischial Containment socket.

the clear check socket to ensure correct positioning of the proximal medial loading of the Ischial Ramus and femoral shaft distal to the Greater Trochanter as well as the loading on the heel pad. Use of the IC socket design enabled a flexible socket to be adopted which reduced the need for straps and allowed a simple cosmetic cover to be applied to the thigh section. The new design allows improved donning and doffing of the prosthesis (figure 9)

Figure 7. Abducted stance in the old prosthesis.

The final result was a more cosmetic prosthesis with improved stability and greater functional mobility. Her lateral trunk bending was reduced immediately and it was recommended that some gait training could be used to reduce this further. The principle of using an IC socket design for PFFD patients with an unstable hip joint is of clear benefit in these circumstances and could be used for those patients whether or not they have had a surgical rotation-plasty.

More than a year since providing the prosthesis, "C" has much less lateral trunk bending, needs the walking stick less often (only on rough ground) and has a more comfortable socket fit. She reports that she has better proprioception, a better ability to recover from a stumble and greater control with the new prosthetic design. She finds that she has

Figure 8. Adducted stance in the new prosthesis

Figure 9. Applying the prosthesis is now easier

greater range of motion at the hip and the ankle than before. Greater insight into the patient's own view of the new prosthesis can be gained from her own website:

http://members.optusnet.com.au/~carikube/pffd/My%20prosthesis.htm.

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Goddard, N. J., Hashemi-Nejad, A., & Fixsen, J. A. Natural history and treatment of instability of the hip in proximal femoral focal deficiency. 145-149.

R. B. DAVIS, S. O., D. TYBURSKI, AND C. BOOMUS. (1988). Biomechanical Comparison of the Quadrilateral and the NSNA Prosthetic Limb Sockets. Journal of the Association of Children's Prosthetic-Orthotic Clinics, 23(2), 36.

Tsirikos, A. I., & Bowen, J. R. (2003). Patellofemoral arthritis in a fused knee with proximal femoral focal deficiency. J Pediatr Orthop, 23(5), 643-648.

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