

## Final Report

### I PRO 309: Educational and Technical Support of Orthotics and Prosthetics Education in Latin America and the US

#### 1. Introduction

Our objective this semester was to continue supporting the Orthotic and Prosthetic (O&P) Technician training program in Bogotá Colombia. There is an unusually large need for creating and supporting educational opportunities in orthotics and prosthetics in Latin America as well as the United States. In support of the first orthotics and prosthetics education program in Colombia that began February 2005 at Centro Don Bosco (CDB) in Bogotá, Colombia, the I PRO student team will continue the work of three previous I PROs by developing new educational modules concentrating on the biomechanics of specific, important pathological conditions such as stroke, spinal trauma, and club foot.

Our material has been translated into Spanish: including brochures, Powerpoint presentations, and a webpage. Our three additional educational modules has furthered our cooperative effort with Joliet Junior College in Joliet, Illinois to support their O&P program.

#### 2. Background

There are over 513 million people (2000 Census) living throughout Latin America and the Caribbean. Approximately 2.5 million of those people have unmet needs in the area of orthotic and prosthetic care. With an estimated 50 certified O&P practitioners and 1500 uncertified practitioners, these statistics show the need for additional accredited O&P technician programs in Latin America. Several institutions have joined to provide education and care to those in need; these institutions are listed below:

- Universidad de los Andes; Bogotá, Colombia
- La Escuela Colombiana de Rehabilitación; Bogotá, Colombia
- Centro Don Bosco, Bogotá; Colombia
- Laboratorio Gilete, Bogotá; Colombia
- Bioconcepts, Inc.; Burr Ridge, IL
- Dynamic Orthotics and Prosthetics; Houston, TX
- Children's Memorial Hospital; Chicago, IL
- Joliet Junior College Tech Prep Program; Joliet, IL
- Northwestern University Prosthetics and Orthotics Center; Chicago, IL
- Illinois Institute of Technology, Chicago, IL

In October of 2004 Centro Don Bosco (Bogotá, Colombia), Don Bosco University (San Salvador, El Salvador), and the Laboratorio Gilete (Bogotá, Colombia) signed an agreement to establish the first accredited O & P education program in Colombia. Since then, Centro Don Bosco has allotted 3500 square feet of space to the

program; this, along with their faculty and vocational workspace, allows for the classroom and manufacturing training required for a Category 3 program. Now that the program has been started there is a need to accredit the program by ISPO standards.

### 3. Purpose

The initial objectives of the IPRO were to develop educational modules that will aid in the accreditation of an ISPO Category Three program. The Category Three program involves training Orthotists and Prosthetists who are able to build devices to improve patient's quality of life. The modules are being implemented in Bogotá, Colombia at Cento Don Bosco High School and also at Joliet Junior College, in the United States. We are trying to develop hands-on, interactive sessions that can be used as learning and review material in the subject of the biomechanics of human movements. The group was divided into sub-teams to cover the topics: spinal trauma, stroke, and club foot. Accrediting the program will allow the students to further their careers. After a student has received a Category 3 certificate from an accredited institution with enough experience the student can also receive a Category 2 certificate. A Category 3 practitioner cannot treat patients; therefore, by receiving the Category 2 certificate the practitioner will then be able to work directly with the patients and more patients can be helped in a shorter amount of time. This impact can be made sooner with the help of the IPRO by creating educational modules necessary for the program to receive ISPO accreditation.

Most importantly Centro Don Bosco has students who are interested in the program. The first class began in February 2005 with 17 students. The impact these students have will be irreplaceable; in one year collectively the students will produce over 200 orthotic/prosthetic devices. The first graduating class will affect a total of over 100,000 patients throughout their careers.

Although the accreditation of the program in Colombia is the main effort, the IPRO team's work will serve multiple purposes. The educational modules will also be provided to the Joliet Junior College (JJC), who is also establishing an O & P program. Many of the students at JJC speak Spanish, which further emphasizes the need to translate all educational materials to Spanish. The equivalent to ISPO in the United States is called the American Board of Certification in Orthotics and Prosthetics (ABC), which is independent of ISPO. The ABC standards of accreditation will also need to be taken into account.

### 4. Methodology

To assist in the accreditation process IPRO 309 students created educational modules to be used for the classroom portion of the educational program at Centro Don Bosco. Previous IPRO groups have focused on biomechanics, pathologies, common O & P devices, and medical conditions. This semester research continued on common medical conditions and the orthotic devices used to treat them. The educational modules created this semester covered non-surgical treatments for club foot, spinal trauma, and stroke.

These educational modules are translated into Spanish so they can be used by the faculty and students at Joliet Junior College as well as Centro Don Bosco. These modules will be reviewed by practitioners in the industry to provide feedback and advice to ensure the information will help improve the program.

Three subgroups have been created to research and compile the educational modules. Each group created computer presentations as well as pamphlets to effectively convey their research in a way that will be easily incorporated into the lesson plans of teachers at Centro Don Bosco and Joliet Junior College. Each individual group delegated their tasks and created a work breakdown structure that would allow the effective completion of the educational modules.

## 5. Assignments

Our subgroup breakdown is as follows:

### *Club Foot Work Breakdown Structure*

The responsibility of the club foot subgroup was focused on creating an educational module about club foot and its treatments; to accomplish this, the individual tasks have been assigned as follows:

- Allison Bagby, Mechanical Engineering
  - Ponseti method of treatment
- Solomon David, Biomedical Engineering
  - Consequences and problems associated with untreated club foot
- Heather Selby, Biomedical Engineering
  - Surgical methods of treatment

By dividing the research in such a way, the subgroup effectively created an educational slideshow along with pamphlets that complimented the slideshow. Each person also provided background information on the condition such as causes, statistics, etc. The focus was on orthotic treatment of club foot. Emphasis was placed on the efficacy of each of the treatments and which was the most viable treatment economically.

### *Spinal Trauma Work Breakdown Structure*

The task of the spinal trauma subgroup was to create effective educational modules regarding spine trauma and its treatments. We delegated the individual tasks as follows:

- Seth Buntain, Aerospace Engineering
  - Breakdown of injury types, anatomy (of spine), halo and collar orthotics
- Hua Chen, Biomedical Engineering
  - Mechanisms, TLSOs
- Lydia Bengel, Mechanical Engineering
  - Construction & Biomechanics, breakdown of injuries, TLSOs
- Ryan Yartzak: Biomedical Engineering

- Vocabulary (stable vs. unstable, compression), incidence (in Colombia/Latin America), economic impact, statistics, LSOs, TLSOs, halo and collar orthotics

The research had been divided in this way for the initial educational module regarding basic spinal trauma treatments. Research focused on orthotic treatment of spinal injuries. For each section all group members were assigned specific information to research, similar to the way the research was divided for the initial module. To go along with each module a pamphlet was constructed providing an overview of the researched information.

#### *Stroke Work Breakdown Structure*

The objective of the stroke subgroup was to research and present useful information regarding stroke and its treatments. Individual tasks have been delegated as follows:

- Eduardo Aramayo, Materials Science and Engineering, Mechanical Engineering
  - Statistics of stroke, risk factors, and spasticity caused by stroke
- Emily Moore, Aerospace Engineering
  - General effects of stroke and paralysis caused by stroke
- Stefanie Rozborski, Art and Architectural History
  - Definition of stroke and paralysis caused by stroke
- Cristina Kovacs, Computer Science
  - Vocabulary associated with stroke and spasticity caused by stroke

By dividing the research in this way, the subgroup was able to focus on the very basics of stroke: definition causes/risk factors, effects, and treatment, specifically, orthotic treatment for physical effects. Each individual was responsible for their part of the research, the organization of data collected, and the generation of basic slides that were compiled for the final presentation. The final presentation was then submitted to and reviewed by the whole group for feedback and further additions and adjustments. Following the completion of our group's final presentation, an equivalent presentation was made in Spanish and available for use as an education module in the field of orthotics and prosthetics.

In addition to research assignments, some group members have been assigned an administrative task. The administrative tasks ensured timely deliveries, proper planning and adequate information media. The administrative tasks were as follows:

- Allison: *Project Manager*: The project manager oversees all of the operations as well as announces daily meeting agendas. The project manager also ensures all administrative tasks are being taken care of as well as informs team members of deliverable deadlines.
- Eduardo: *Content Project Manager*: The content project manager oversees the production of the educational materials as well as instructs subgroups on what is expected of them for each deliverable. The content manager also ensures all deliverables are uploaded to iGroups on time.

- Lydia: *Webmaster*: The webmasters will create a website to make all educational materials available to the public in English and Spanish.
- Ryan: *Vocabulary Manager*: The vocabulary manager will compile the pertinent vocabulary from each of the three subgroups into one easy-to-use note sheet.
- Heather: *Minute Recorder*: The minute recorder will record all group discussions at the meetings as well as post any deadlines that have been decided upon on iGroups.
- Heather & Stefanie: *Poster Designer*: The poster designers will create the poster for IPRO Day and collect all pertinent information from each subgroup.

To further ensure timely completion of all IPRO deliverables the subgroups reported the information requested by the Project Manager and Content Project Manager approximately one week before the deliverable was due. At this time the Project Manager and Content Project Manager compiled the reports and allowed the advisor and team to review the documents.

## 6. Obstacles

Some of the obstacles that we had faced throughout the course were technical vocabulary and translation of all materials into Spanish. Because the target audience is senior level high students and first year college students we had to be conscious of their comprehension of the detailed technical terms within our presentations. We overcame this obstacle by creating vocabulary handouts for each module that clearly defined the technical terms included.

Due to the primary language at Centro Don Bosco being Spanish, it was critical that all materials be translated into Spanish. This was an obstacle because our team only had one Spanish speaking member. We had overcome this obstacle with the assistance of Michael Morley and Jared Gardner who had previously worked on this project.

## 7. Results

We have successfully completed the formation of the three educational modules of club foot, stroke, and spine trauma, each of which includes: a PowerPoint presentation, brochure, and vocabulary handout. Although these modules will not completely satisfy the needs of the program in Colombia they are another step towards completion. The work of previous IPRO teams as well as the intended work of future IPRO teams along with this semester's work will eventually allow the classroom portion of the program in Colombia to have sufficient learning materials to become accredited. It is also intended to continue working on setting up corresponding IPRO programs at Universidad de los Andes and JJC. With these programs in place the projected results will triple allowing for much faster results regarding the ultimate goal of accreditation.

## 8. Recommendations

Currently the educational modules thus far focus on single pathologies. To maximize the efficiency of the material that has been developed in the last four semesters

of IPRO 309, future teams should organize the already existing information into meta-modules based on patient's age. Typically O&P practitioners specialize by age group (pediatric, adult, geriatric) and not specific injury types.

## 9. References

International Society for Prosthetics and Orthotics  
<http://www.ispo.ws>

IPRO 309, Fall Semester 2007  
<http://www.iit.edu/~ipro309f07/>

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## 10. Acknowledgements

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