

Spring 2011  
Final Report

# Orthotics and Prosthetics Education in Latin America

*“Give a man a fish for a day and he eats for one day, teach a man to fish and he will eat for the rest of his life.”*

*“Education is the most powerful weapon which you can use to change the world”  
~ Nelson Mandela*

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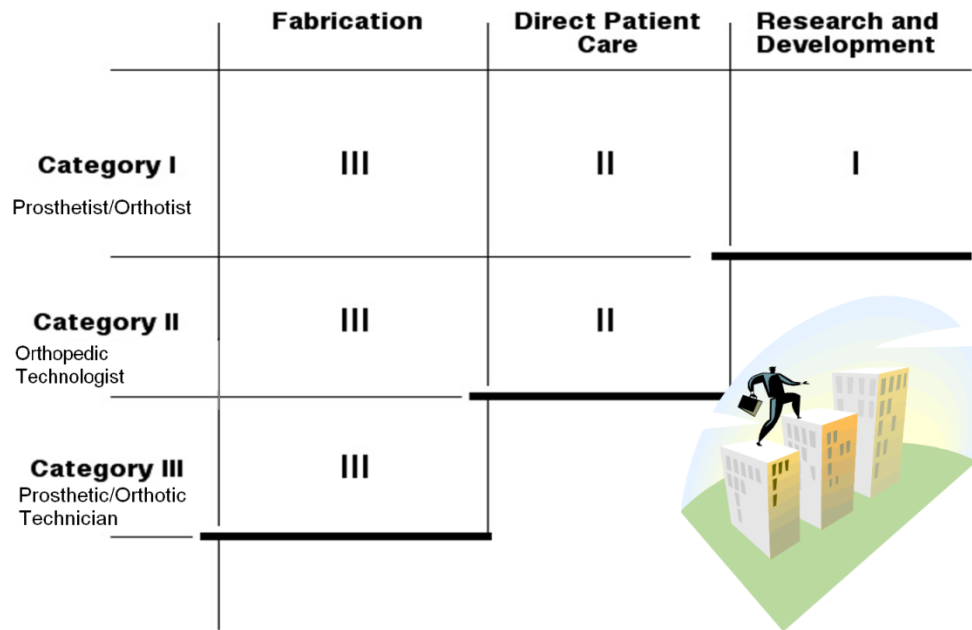
## **Executive Summary**

Access to health care is a universal problem. In Latin America alone, the availability of orthotic and prosthetic (O&P) treatment is limited due to the lack of certified practitioners. This occurs mainly because there is limited education regarding orthotics and prosthetics and the majority of the population is therefore unaware of existing treatments.

IPRO 309 aims to help facilitate the educational programs in Latin America, focusing specifically in Bogotá, Colombia, where an O&P program has already been established at Centro Don Bosco, a technical high school in Colombia. This semester, IPRO 309 created educational material to supplement the cross-disciplinary capstone course introduced in the previous semester. This semester, the IPRO team created capstone course materials and activities focused on three areas related to O&P education: Patient Well-Being, Material Compatibility, and Medical Record Keeping.

## **Background**

Orthotics and Prosthetics (O&P) is the evaluation, fabrication, and custom fitting of artificial limbs and orthopaedic braces. An orthosis is an external device that can control, enhance, and prevent movement and reduce deformities. A prosthesis is an artificial replacement of an internal or external body part. The O&P educational track has three categories that are set by the International Society for Orthotics and Prosthetics (ISPO), which is the international governing body for O&P. These categories are Category I, II, and III. The categories are shown in Figure 1 below:

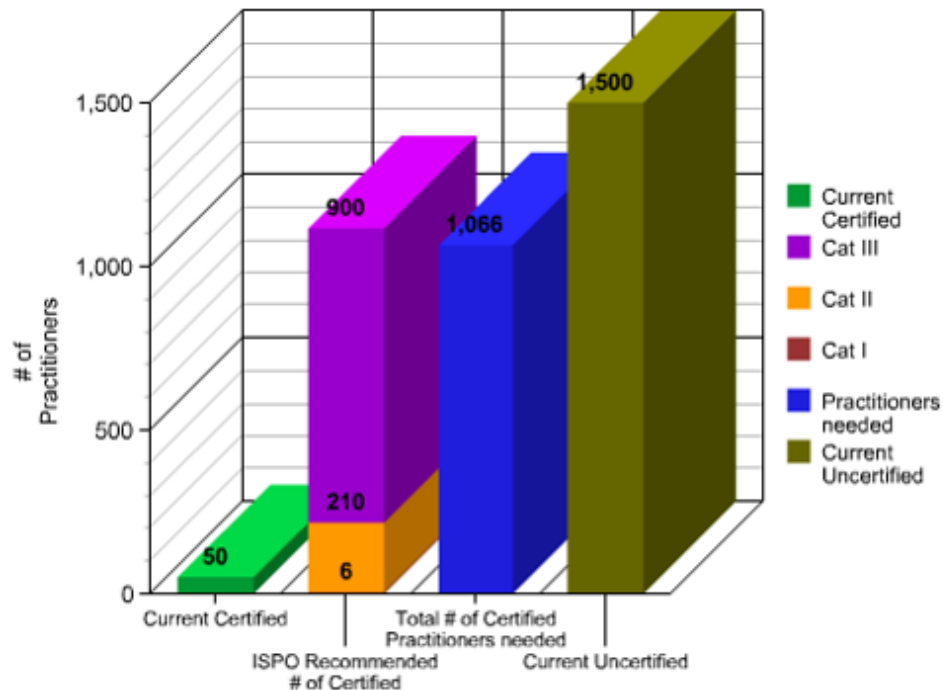


**Figure 1:** Category I, II, and III and their main tasks.

As shown in Figure 1, people in Category I are usually known as the orthotist or prosthetist. Their main tasks are in research and development, direct patient care, and device fabrication. Category I is equivalent to a 4-5 years university degree. Category II is usually comprised of the orthopaedic technologist, whose main tasks include direct patient care and device fabrication. Category II technologists usually have taken a three year non-degree program. Category III are usually the prosthetic and orthotic technician, whose sole task is the fabrication of devices. Their education equivalence is similar to that of a two year high school or junior college program. Although these O&P categories need to work together in the professional world, they are trained separately during their education.

There are an estimated 2.5 million people in Latin America in need of O&P care and only 50 certified and 1500 uncertified O&P practitioners in that area (ISPO O&P statistics survey in Colombia). These numbers are shown in Figure 2. The Orthotics and Prosthetics Education in Latin America and Illinois Institute of Technology's Interprofessional Project (IPRO 309) have

always felt that the most effective way to rectify this discrepancy is through the education of more O&P personnel.



**Figure 2:** Current and Recommended Number of O&P Practitioners in Colombia.

Currently, Bogotá, Colombia is one of the few cities where the programs for all three categories will exist. Category I training will be covered by the Military University, which is associated with the Central Military Hospital. The first students will be able to matriculate within the next few years. Category II training will occur at the Servicio Nacional de Aprendizaje (SENA). This translates to the National Training Service. Category III will be at Centro Don Bosco, a technical high school with a well-established O&P technician program.

Spring of 2011 was the eleventh semester of this IPRO, and as such, there was a lot of material to reference and build on. Almost all of the past IPRO 309 teams have focused on creating educational modules for orthotic and prosthetic technicians. The subjects for these modules have included non-surgical treatment for stroke, spinal trauma, and club foot patients; general treatment for common spine, upper and lower limb ailments; and lower limb prosthetic

devices for pediatric, adult, and geriatric patients. In addition, a few teams have been more concerned with the learning process and have focused on applying project based learning to O&P education. Finally, last semester's team created a cross category senior level capstone style course in which students in their last semester actually treated patients under professional supervision.

In addition to previous work, it is important to note the effects of cultural influences and their psychological implications in Latin America.

Stigma is a set of “negative attitudes and beliefs that motivate the general public to fear, reject, avoid and discriminate against people with any disability or mental illness” (New Freedom Commission on Mental Health 2003). Stigma may be influenced by the diagnosis or type of disability. Health care providers can contribute to the stigma experienced by patients. One source of stigma is the “careless use of diagnostic labels” by health care providers and others (Sartorius, 2002). Health care providers and the public may stigmatize against certain illnesses, and some diagnostic labels may be harmful when they are not completely understood by patients, families, community members, and policy makers. Health care providers at the different levels need to be aware how their interactions with the patients can affect their treatment, recovery and the acceptance of the new prosthesis.

Family is a core theme in Hispanic culture. Familism is the belief that family is central to one's life over the needs of the individual. Schiavenato (1997) found that families are very influential in assisting other family members to make decisions about seeking and using health services. The centrality of the family should be used as part of the treatment and recovery of any patient under our care. The traditional Hispanic view of health is a holistic standpoint where one cannot separate physical problems from non-physical problems. What this means for us is that,

our patient may come for a prosthesis, but he/she will also talk about their emotional problems. Epidemiology studies indicate that Hispanics experience more mental health problems not because a genetic disposition as it is a belief in some communities, but as now is well documented that the experience of psychological stress that stems from poverty and disability. The cumulative psychological distress from the various sources can be overwhelming, increasing the risk for mental health problems.

We have a unique opportunity to create a model of service in that mental health and physical health can be addressed, the physical disabilities are clear but there are other components to the well-being of the population we intend to serve where a holistic model of health care can be implemented.

### **Objective**

The objective of this semester's IPRO 309 was to design educational materials to incorporate within an interdisciplinary capstone course for Categories I, II, and III from framework proposed by last semesters's IPRO 309. Fall 2010's IPRO 309 proposed an educational curriculum that helped train individuals in Orthotics and Prosthetics in Categories I, II, and III.

This spring 2011, the IPRO team designed seminars focusing on patient interaction, working with an interdisciplinary team and activity/discussion based learning. The main areas that were addressed were psychosocial patient well-being, materials selection, and medical record keeping.

The seminars will contribute to the education at the institutions in Colombia mentioned earlier: Centro Don Bosco, Servicio Nacional de Aprendizaje (SENA), and the Military University associated with the Central Military Hospital.

## **Organization and Approach**

To address the objective, the IPRO team was divided into three subgroups, with each subgroup responsible for the conception and development of five seminars. The three subgroups were: Patient Well-Being subgroup, Materials subgroup, and Medical Record Keeping subgroup.

The Patient Well-Being subgroup focused on the psychosocial health of patients and the Eight Stages of Adjustment. The theme of family in the Latin American culture was also to be addressed.

The Materials subgroup focused on the concept of biofidelity and material selection for O&P devices. Engineering calculations to decide on the most compatible material were also to be introduced.

The Medical Record Keeping subgroup focused on the techniques of medical record keeping and their application in medical fields today. This subgroup would also focus on how to take and keep proper medical records.

Each subgroup was to create five seminars that included an introductory and closing seminar. The seminars would also include examples, activities, case studies, discussions, and look at ethical concerns related to the area. All fifteen seminars were to be interdisciplinary and address all three ISPO categories.

In order to keep track of the progress of each subgroup, presentations and discussions regarding the seminars were to be scheduled every week during the times the IPRO group would meet. The subgroup presentations were all presented to Dr. Kevin Meade. Dr. Meade is the instructor for this IPRO course but at the same time, he is a member of multiple institutions in Colombia. As such, he has acted not only as an instructor but as a representative of our clientele in Colombia. Additionally, the group went on three field trips total. Two field trips were to

BioConcepts, an O&P center, and one field trip was to Children's Memorial Hospital.

BioConcepts allowed the IPRO group to get hands on experience on the creation of orthopedic devices, while Children's Memorial Hospital allowed the group to gain some insight on pediatric care.

This IPRO project was to be completed by April 28<sup>th</sup>, 2011.

### Results and Analysis

Fifteen presentable seminars were prepared for use in Centro Don Bosco, five for each capstone subgroup. The following table shows the seminar topics each subgroup designed:

Subgroup	Seminars				
	Seminar 1	Seminar 2	Seminar 3	Seminar 4	Seminar 5
<b>Psychosocial Patient Well-Being</b>	Introduction	Pediatrics	Adults	Geriatrics	Conclusion and Ethics
<b>Materials Selection</b>	Introduction	Crystal Structure and Friction Effects	Polymers	Metals	Systematic Design Approach and Ethics
<b>Medical Record Keeping</b>	Introduction	Writing a Medical Record	Accessibility	Electronic Medical Records	Privacy and ethics

Using the seminars for patient well-being, students will be able to assess the psychosocial health in any age range. They will be able to address the importance and impact of the patient's family and evaluate the ethical implications of patient treatment.

The seminars for material selection will enable students to recognize factors influencing structure properties. Students will also be able to make appropriate and educated design decisions.

The medical record keeping seminar will allow students to write and choose the type of medical records they want to use. They will understand the impact records have on patient care and the ethical implications that need to be considered. Students will also be able to



communicate with allied healthcare professionals through medical records.

Although it seems that each subgroup's topic is independent of the other two, it is important to note that in practice these topics come together and must be dealt with by the medical professional. The following is an example of how these areas might relate:

A study conducted by Donovan-Hall, Yardley and Watts (2002) focused on the appearance of a prosthesis for the well-being of amputees. The study cited that "attitude towards the prosthesis was not associated with mobility, which therefore suggests that although amputees may have a good level of mobility, they may still be unsatisfied with their prosthesis".

Through this IPRO, the group gained personal insight regarding the challenges faced during O&P treatment, both in the fabrication aspect of it and the patient interaction. With the field trip to BioConcepts, the group was able to experience firsthand the creation of an orthosis. Additionally, the group was able to gain insight on the challenges medical professionals face with children undergoing O&P treatment and the concerns or issues parents might have.

### **Conclusion and Recommendations**

It is important for the three ISPO categories to communicate and work as part of an interdisciplinary treatment team. This is the best way to improve patient well-being. It is also important to convey information effectively to students outside of their normal field of study, and be able to accept the cultural differences that other countries might have.

Ethics are also a major concern, not only knowing the codes of conduct but also the impact it has on a patient. Healthcare professionals need to take into consideration the comfort

and emotional integrity of patients. They must also make decisions regarding the structural integrity of a device versus the ease of manufacture. Professionals also need to take into account and maintain the privacy of patient records.

Hopefully these seminars will help increase O&P education in Colombia and allow healthcare to improve.

IPRO 309 is at its eleventh semester, and with the creation of the capstone courses, it seems only appropriate to conclude the IPRO course here. However, a few members of our team have also identified a similar need of O&P training in Mexico.

**References:**

[www.oandpcare.org](http://www.oandpcare.org)

[www.opcareers.org](http://www.opcareers.org)

[www.ispoint.org](http://www.ispoint.org)

ISPO Guidelines

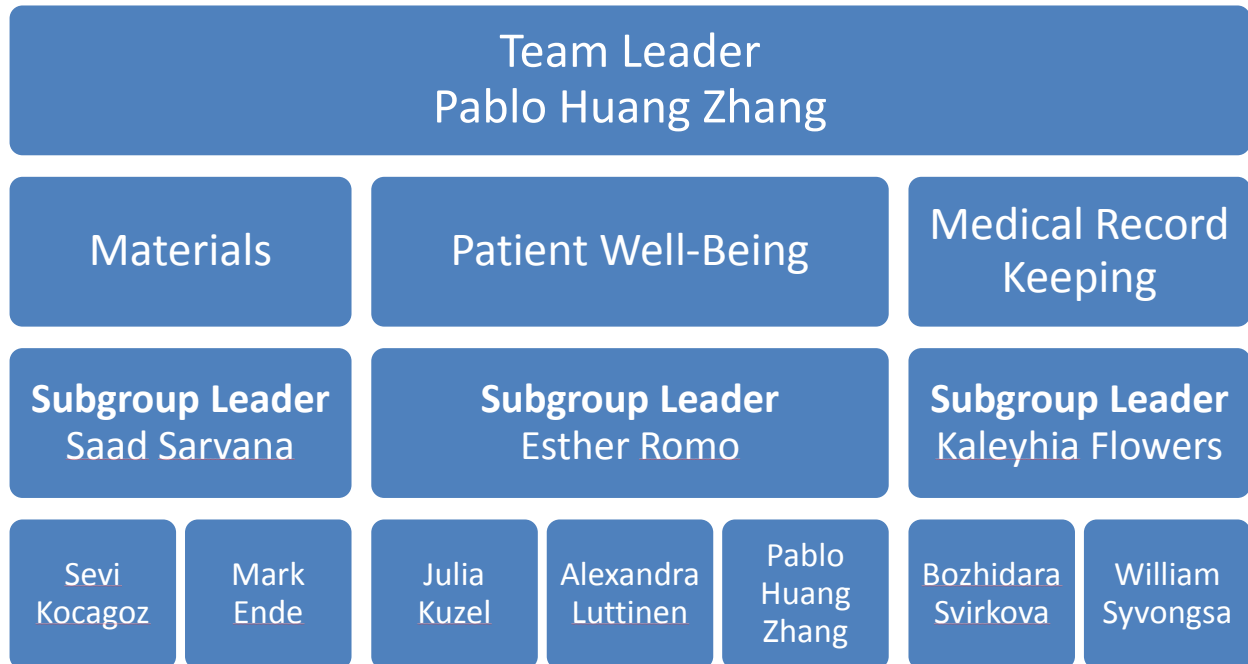
WHO Guidelines

Special Thanks to:

Dr. Kevin Meade, BioConcepts, Inc.

Dr. Bryan Malas, Children's Memorial Hospital

Zachary Albright

**Appendix A: Team Information and Structure****Appendix B: Budget**

Total Budget: \$4,000

Expenses:

Field Trips: \$200

Total used: \$200

## Appendix C: Sample Seminar Activity

### Case Study 1- King, a bilateral transfemoral amputee

The following is a summary written by Ilze Grobler (Psychologist) of the history of King's relationship with his disability, as described by King:

"King, a 19-year-old black male, led a full, childlike life when his life took a change at the age of eight. He was playing with some friends in his neighbor's garden when a car lost control, smashed through the fence and in the process a huge rock crushed both his legs. A bilateral transfemoral amputation followed during his hospitalization. Two years later, at the age of 10, King received his first prosthetic legs after being bound to a wheelchair. However, the effect of disability on King's life was very unhelpful. During our initial conversations, King told me that disability had such a profound effect on his self-esteem, that it convinced him that he would not be able to walk without having to use crutches. It also robbed him from his ability to play soccer and to do things for himself. Disability tried to convince King that he was inferior and that he would not be able to attend the same school as his peers.

However, at the age of 16, King was referred to another prosthetist who fitted him with new prosthetic legs and encouraged him to stand up against disability and to let go of his 'emotional crutches'. This experience opened up a narrative space in King's life that allowed him to discover an alternative relationship with disability. King moved to a new school where he felt compelled to live within the boundaries of what is expected from a disabled person. He discovered and interest in drama, acting and singing in the school choir. Although the effect of disability in King's life was becoming less intrusive, he still encountered feelings of frustration and a fear of rejection, in particular by his female counterparts. Disability's tactics was to convince King that girls are not interested in him because of his disability. This in turn affected his interpersonal relationships, losing his temper easily and feeling disrespected by others. <sup>41</sup>

1. Which stages of adjustment are present in King's story?
2. Which aspects of his story stand out as points you may use while treating a similar patient?
3. Grobler used narrative therapy and presents the disability as a noun, rather than an adjective. What advantages can come from this view point? Are there any disadvantages?
4. In what ways could you help encourage King?

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<sup>i</sup> Grobler I. (2008). Re-defining self after limb loss: a psychological perspective. *Prosthetics and Orthotics International*. 32(3), 337-44.