Human Orthotics and Prosthetics Education

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Team Purpose

To create awareness of the immense need for orthotic and prosthetic educational centers in Latin America and the United States because of the high unmet needs for orthotic and prosthetic care and the need to train ISPO Category III Prosthetic/Orthotic Technicians.

Background

Why?

Latin America has:
2.5 million people with disabilities and unmet needs.
Currently there is only one accredited O&P educational program in Latin America.
There are fewer than 50 certified category III practitioners and 1,500 uncertified practitioners.

How?

This will be accomplished by learning about Orthotics and Prosthetics within our IPRO, creating educational materials about fabricating orthotics, and testing the effectiveness of the materials by using them to fabricate an actual orthotic device.
In order to support the curriculum at Centro Don Bosco, the team is divided into three subgroups, each in charge of researching a pathology and the corresponding orthosis/prosthesis that is used to treat it. Once finished, each subgroup develops and tests their training module in order to demonstrate the fabrication process.

Structure

The team was divided into three subgroups based on a specific division of the body as related to orthotics and prosthetics. Each subgroup then researched specific pathologies relating to an orthotic or prosthetic device, and then proceeded to develop an orthotic device based on their research. The subgroups were: Upper-Limb, Spine, and Lower-Limb.

Subgroups

Lower Limb

Blount's Disease is a developmental disease of unknown cause. The child develops a bone deformity in the lower legs which causes bow-leggedness, which over time worsens and becomes inoperable past early adolescence. Treatment of Blount's Disease is often in the form of a knee-ankle-foot orthosis (KAFO).
There are two types of stroke. 85% of strokes are Ischemic, which occurs when arteries are blocked by blood clots or by the gradual buildup of plaque and other fatty deposits. Hemorrhagic strokes occur when a blood vessel in the brain breaks, leaking blood into the brain, and are responsible for more than 30% of all stroke deaths. The most common treatment for stroke is either a KAFO or AFO.



Spine

A vertebral compression fracture due to osteoporosis occurs when the vertebrae in the spine are weak due to osteoporosis, so when the vertebrae become compressed against one another they either crush, burst, or wedge. Treatments include surgery, spinal fusion, or an orthosis such as an LSO with an anterior opening. These fractures can be prevented by managing calcium intake and teaching good posture habits.


Upper Limb

The brachial plexus is a group of nerves running from the spinal cord to the brachial nerves. The brachial plexus controls the movements of the shoulder, elbow, wrist, and fingers. In the case of an injury, the victim may lose some or all of their upper limb movements and may or not get it back after treatment. A brachial plexus injury can be treated by surgery, an orthosis, or a prosthesis. Depending on the area of the injury, the orthosis may be shoulder elbow wrist orthosis (SEWO) or an elbow wrist orthosis (EWO). In the case of an arm amputation, a prosthesis of the arm can be used so the patient can gain some movement back. When an injury occurs, but the limb is still healthy, a prosthesis is used. An orthosis is placed over the healthy limb to act as a prosthesis.


Benefits

Orthotic and prosthetic treatment is an effective way to assist disabled or impaired individuals in the common activities of daily living, and to improve a person's overall quality of life. The primary benefit of these educational modules is the assistance provided to the training and accreditation of Category III Orthotic and Prosthetic technicians in Colombia and the United States. These modules will be used both at Joliet Junior College and Centro Don Bosco.


Fabrication

Common Steps

1) Place nylon stockinet on patient's area of treatment
2) Using an indelible pencil, mark specific anatomical landmarks on area of treatment
3) Use fiberglass wrapping to cast a splint
4) Remove the splint via scissors
5) Enclose the fiberglass splint by re-wrapping to create shell of mold
6) Mix water with plaster
7) Place a *bent* pipe into mold and pour plaster into the mold (around the pipe)
8) Allow to dry thoroughly and remove fiber glass casing from mold via a cast saw
9) Modify mold by taking down and building up in appropriate locations to relieve stress and provide support
10) Place cotton stockinet over the mold
11) Place foam padding on mold if necessary
12) Heat selected material in oven until it becomes flexible
13) Ensure workstation vacuum is turned on to place material over mold
14) Remove heated material from oven and pull over fabrication mold
15) Allow material to cool and finish edges with buffers for safety and comfort
16) Install appropriate joints and straps to orthosis