The Scoliosis Project...
... a hands-on experience
"We make a living by what we get, but we make a life by what we give."

- Norman Mac Ewan
...For he who is the least among you all - he is the greatest...

- Jesus, Luke 9:48
..Try not to become a man of success but rather try to become a man of value.

- Albert Einstein
Nobody made a greater mistake than he who did nothing because he could do only a little.

- Edmund Burke
IPRO 319: Service – Learning Abroad Project

Fabrication and Teaching the Use of an Orthopedic Brace Measuring Kit

Advisor: Dr. Kevin Meade
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Goals / Mission

- Service – Learning vs traditional IPROs
- Why El Salvador?
- Why Scoliosis?
- Non-surgical treatment vs surgery
- Our Team: MD, ENGR, PT, CO
- We’re actually going!!!
What is Scoliosis?

- Lateral curving of the spine
- Rotation of curve within vertebrae
- Either S or C shape
- Females affected 3 times more than males
- Commonly diagnosed during adolescence
- About 2% of the world population has scoliosis
Normal vs. Scoliosis

Normal Spine

Scoliotic Spine

Normal Spine

Scoliotic Spine
Types of Scoliosis

- Congenital*
- Idiopathic*
- Neuromuscular
- Functional
Congenital Scoliosis

- Due to bony abnormalities of the spine present at birth. These anomalies are classified as failure of vertebral formation and/or failure of segmentation.
- Part of the spine is usually fixed
- Associated with malnutrition
- Majority of third world cases are congenital
Idiopathic Scoliosis

- A structural spinal curvature for which cause has not been established.
- 70% of all cases of scoliosis are idiopathic.
- Over 90% of adolescent idiopathic scoliosis cases are female.
Using the Alignment Kit

- Goal is to apply corrective forces thus providing a straightened torso for a casting. This cast is used to make a brace.
Kit Definition

- Arrangement of pads applied to align an abnormal spinal curve for precise, reproducible casting

- Need for kit:
  - Standardization
  - Process imperfections
  - Easier to use
  - Efficient: people, time

- Design Considerations
  - Shape, Size, Attachments
Kit Improvements

- Stiff poly-propylene $\rightarrow$ Flexible poly-ethylene
- One size $\rightarrow$ Multiple sizes (infant to adult)
- Similar Pads $\rightarrow$ Symmetrical Pads
Kit Improvements

- Riveted Straps → Slides to prevent shifting
- Buckles → Tension Buckles (ease of use)
- Increments of Recording → Full metric system
Kit Material List

- **Pads:**
  - Axilla (symmetrical) = 1 x 4 sizes = 4
  - Thoracic (symmetrical) = 1 x 4 sizes = 4
  - Lumbar (nonsymmetrical) = 2 x 4 sizes = 8
  - Trocantor (symmetrical) = 2 x 4 sizes = 8

- **Straps**
  - ¾” strap (6ft long) 5 max. = 5
  - 1½” strap (6ft long) 5 max. = 5

- **Buckles**
  - 2 per strap, 10 max. = 10

- **Clamps**
  - 5 max.

- **49 TOTAL PIECES PER KIT**
Kit Components

- Clamps
- Axilla Pads
- Trocanter Pads
- Thoracic Pad
- Lumbar Pad
- Buckles
Kit Setup

Axilla Pad

Trocanter Pad

Thoracic Pad

Axilla Pad
Kit Setup
Casting

-Very basic materials: Plaster laced sheets and water
Creation of a Cast
Completed Cast
Mock Workshop

- NUPOC Students visited IIT
- Three Case Studies Analyzed & Presented
- Published in O&P Edge Journal
El Salvador

- El Salvador is a country recovering from the ravages of civil war, natural disaster and poverty.
- The incidence of scoliosis and other spinal conditions are related to the high rates of malnutrition in the country.
- El Salvador is the most densely populated Central American country.
- El Salvador’s Don Bosco University hosts the only accredited Orthotics and Prosthetics program in the region.
El Salvador
Dreams do not vanish, so long as people do not abandon them...

- Phantom F. Harlock
Going to El Salvador

- To demonstrate the non-surgical treatment of scoliosis with our kit to MDs and students at Don Bosco University, San Salvador

- Service-Learning: we will learn and bring back more than we can ever teach to the people of El Salvador

- Conference Teams: MD, ENGR, PT, CO
STUDENTS AT DON BOSCO (20)
Each person can teach 10
=200 PEOPLE

Each person can teach 10 more
=2000 PEOPLE

Each person can teach 10 more
=20,000 PEOPLE

Each person can teach 10 more
=200,000 PEOPLE
Workshop Schedule

- **Monday, May 19th**
  - Welcome
  - Anatomy/Physiology
  - Biomechanics
  - Scoliosis Kit
  - Groups & Cases
  - Patient Casting

- **Tuesday, May 20th**
  - Biomechanics
  - Idiopathic Scoliosis
  - Casting Techniques
  - Orthotic Treatment

- **Wednesday, May 21th**
  - Spine Radiology
  - Neuromuscular Scoliosis
  - Round Table
  - Scoliosis Kit Workshop
  - Fabrication of Orthotics

- **Thursday, May 22nd**
  - Orthotic Treatment
  - Congenital Scoliosis
  - Round Table
  - Fitting Patient Orthotics

- **Friday, May 23rd**
  - Case Presentations
Sponsors & Collaborators

- Don Bosco, San Salvador
- Kingsley Manufacturing
- NUPOC
- Orland Park Rotary
- BioConcepts
- Duke, Dr. Gomez
- O&P Edge
- DePaul College of Law
- Valparaiso Literature Professor – Judith Peters
IPRO Members

- Jonathan Beckman, ME
- Mayank Bhatia, CPE
- Ajay Bhatt, MBB
- Jorge Guerra, AE
- Senthil Jayarajan, CS
- Ganesh Kalyanaraman, PS
- Megha Kaushal, MBB
- Abby Krug., CS
- Ronak Lakhia, MBB
- Keira Lonergan, MBB
- Elizabeth Mathew, MBB
- Naga Pannala, MBB
- Atul Patel, MBB
- Monica Polisetty, MBB
- Preaw Prommintr, EE
- Joyce Tan, Arch
- Mark Zachar, CHE
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Sources of Information

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