IPRO 309: HUMAN ORTHOTIC AND PROSTHETIC EDUCATION

Wen Chan

Xuan Kang

Todd Maddamma

Greg Quandt

BACKGROUND

-Latin America> 500 million people

-People need Orthotic and Prosthetic (O&P) treatment>2.5 million

-Only 50 International Society for Prosthetics and Orthotics (ISPO) certified & 1500 uncertified O&P practitioners in Latin America

-Limited educational opportunities in O&P

--Only ISPO certified facility in El Salvador

-Limited opportunities and practitioners leads inadequate or no care

MISSION

-Develop educational modules:

- *Case Studies*
- *Presentations*

To assist the training of technician programs at Centro Don Bosco and Joliet Junior College

-Improve education of proper treatment process

HISTORY

We are 7th semester:

- *1st semester: Biomechanics*
- *2nd semester: Anatomy & Measurements*
- *3rd & 4th semesters: Pathologies*
- *5th semester: Age Relation*
- *6th semester: Pathologies and Orthotic Fabrication*
- *7th semester: Interdisciplinary Treatment Teamwork*

PROBLEM STATEMENT

What do you mean it's out of your scope of practice?

I can't pay for this!

The prosthetic socket is causing me pain!

Why can't you adjust my device?

I want to be able to exercise again!

Improved communication, understanding, and teamwork guarantees the best treatment.

OBJECTIVES

Group

-Develop educational modules emphasizing interdisciplinary teamwork;

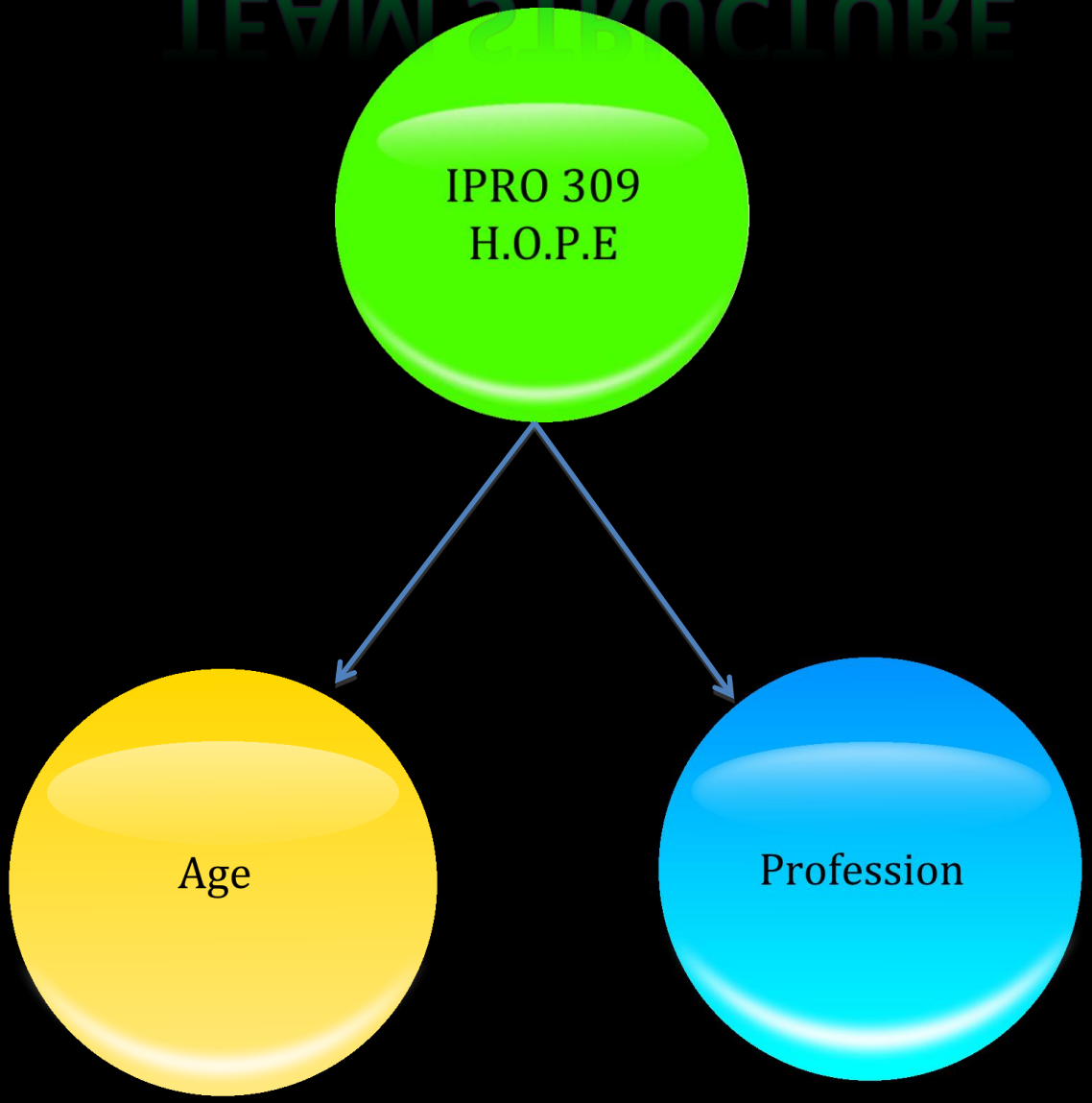
-Translate modules into Spanish for use in Latin America

Sub-Group

-Understand Professional roles in treatment process

-Create presentations and case studies based on realistic patient information

TEAM STRUCTURE



TEAM ROLES

Adult

Patient
Schedule Specialist

Physician
Content Manager

Physical Therapist
Vocabulary Manager

O&P
Co-Secretary

Finance
Treasurer

Pediatric

Patient
Project Manager

Physician
IPRO Day Coordinator

Physical Therapist
Co-Webmaster

O&P
Webmaster & Secretary

Finance
Ethics Coordinator

Geriatric

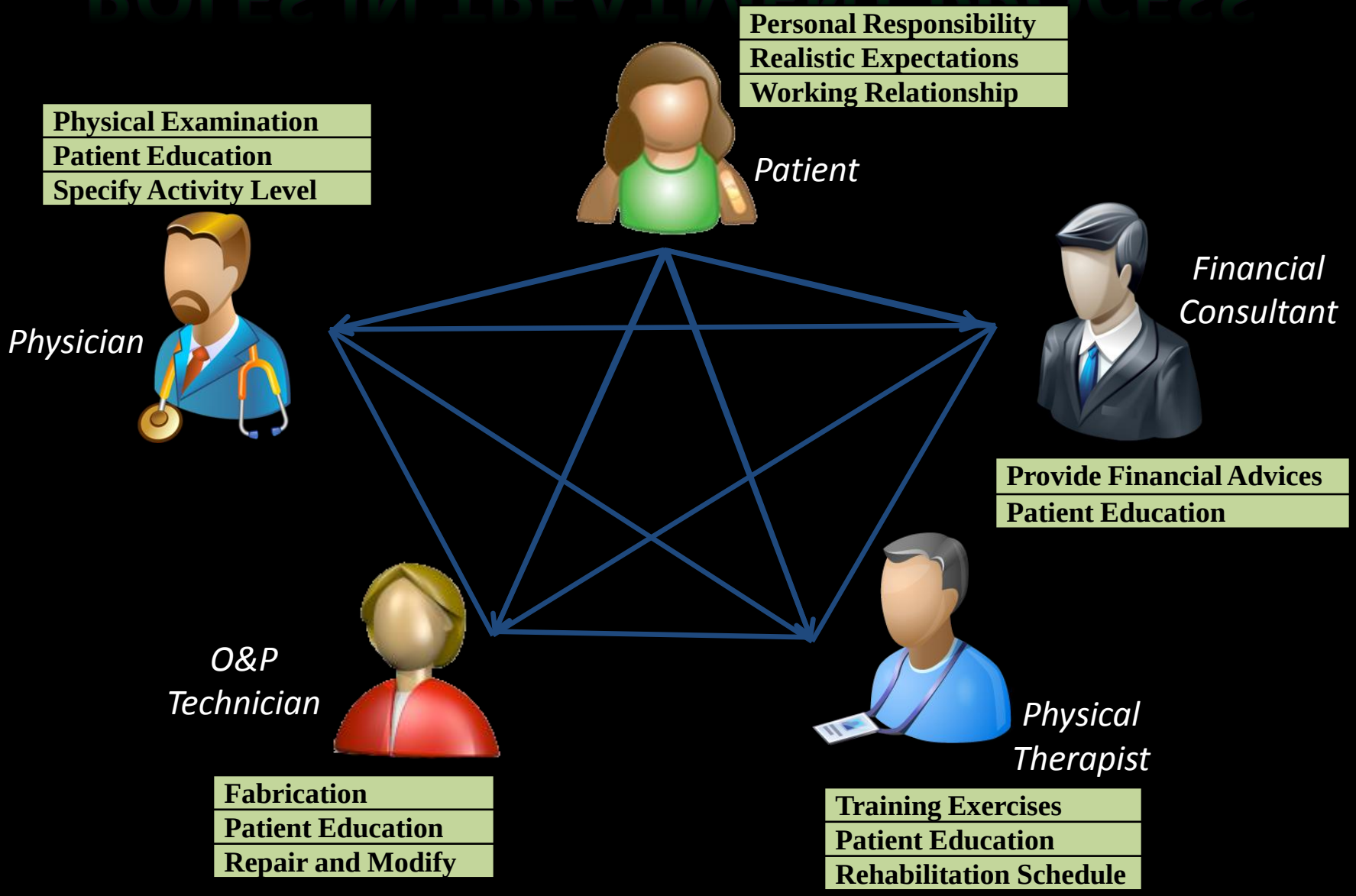
Patient
Translation Manager

Physician
Presentation Expert

Physical Therapist
Field Trip Coordinator

O&P
Accreditation Expert

ROLES IN TREATMENT PROCESS



DEFINITIONS

- *Orthosis*
- *Prosthesis*
- *Transfemoral*
- *Transtibial*
- *K Levels*
- *Bilateral*
- *Unilateral*

INTRODUCTION TO CASE STUDIES

- *One case study per age group*
- *Build fictional characters based on facts*
- *Focused on lower limb prosthesis:*
  - *Bilateral and Unilateral*
  - *Transfemoral and Transtibial*
- *Demonstrated positive rehabilitation teamwork*
- *Students will understand:*
  - ***Causes of amputation***
  - ***Scope of practice***
  - ***Activities of Daily Living***
  - ***Quality of Life***
  - ***Pain Management***
  - ***Costs of Prosthesis***

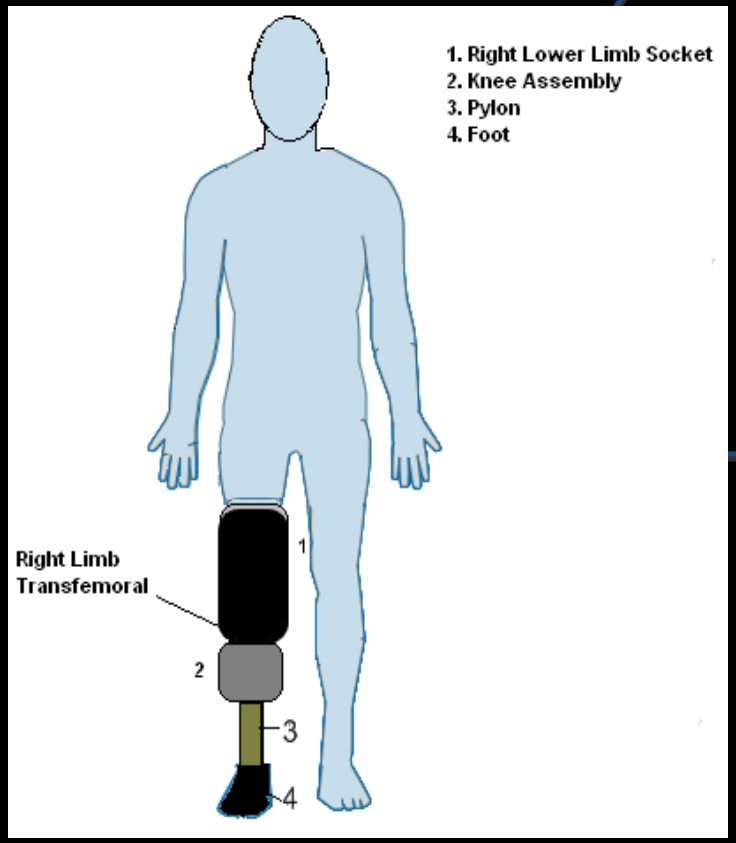
CASE STUDIES

Name:
Miguel

Age:
7

Occupation:
NA

Pediatric



Cause of Amputation:
Congenital Limb Deficiency

Initial Treatment:
K4 Level Prosthesis

Complications:
Pain in residual limb as well as lower back due to poor communication between O &P technician and PT

Geriatric

Modified Treatment:
Prosthesis of adequate length

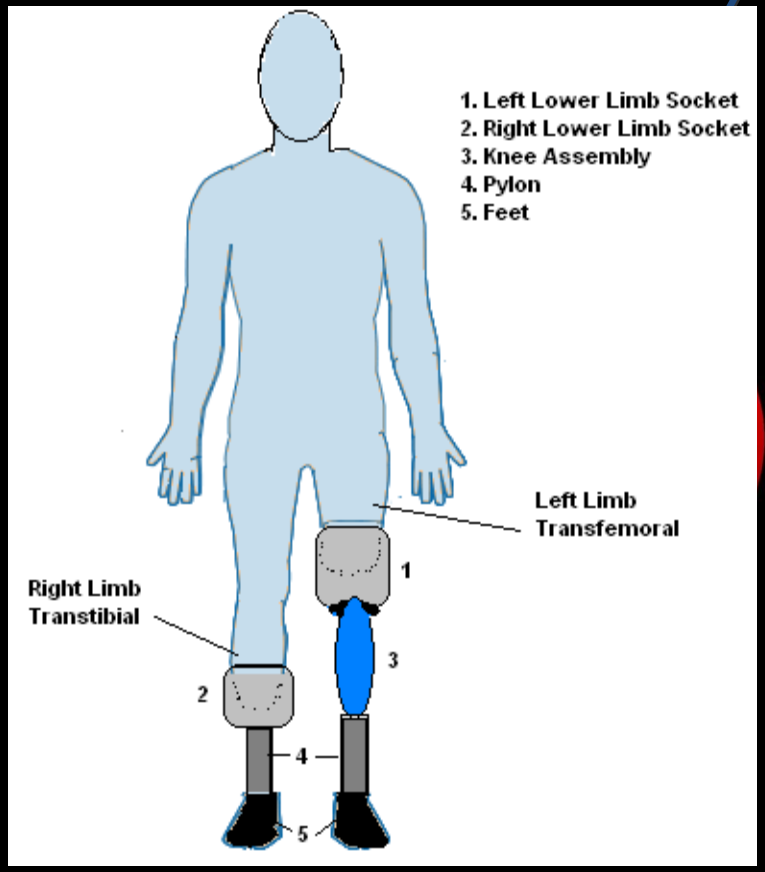
Lessons Learned:
Pediatric require monitoring for growth

Pediatric

Name:
Leslie

Age:
30

Occupation:
Soldier



Cause of Amputation:
Battle Injury

Initial Treatment:
K3 Level Prosthesis

Complications:
Skin Allergy of Residual Limb initially unknown to patient and physician

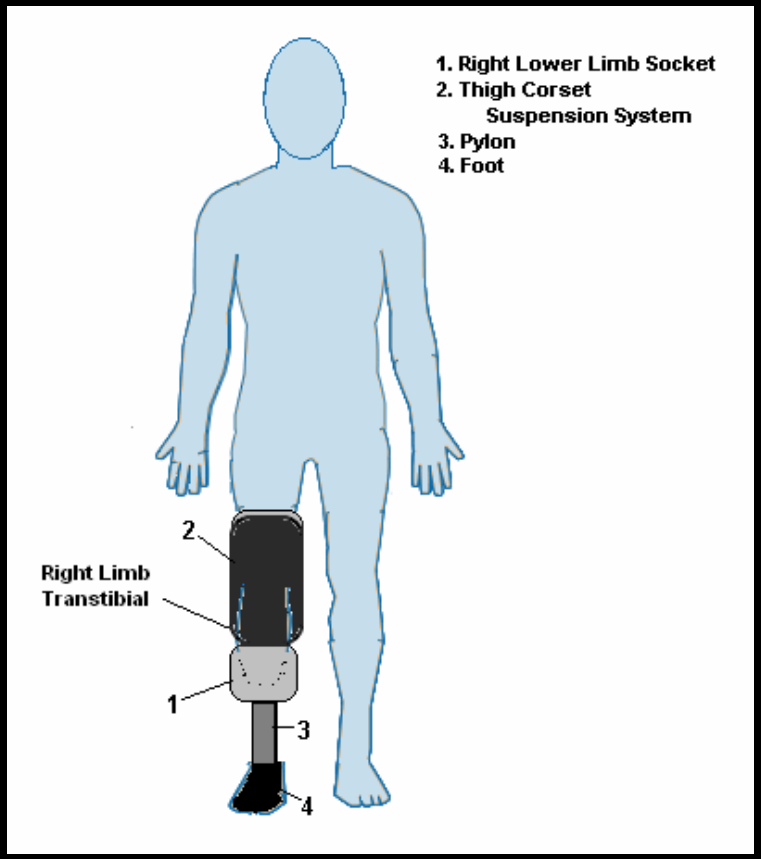
Modified Treatment:
Immediate care of skin rash
Replace prosthetic sock

Lessons Learned:
Over-expectation of treatment
Unknown ailments
Family stress

Name:
Gertrude

Age:
75

Ethnicity:
German immigrant



Cause of Amputation:
Diabetes
Right trans-tibial

Initial Treatment:
K1 Level Prosthesis—very limited

Complications:
Change of K level (from K1 to K2)
Obesity, osteoporosis, & prior knee replacements initially unknown to technician
Lack of family assistance

Modified Treatment:
Change of suspension and ankle/foot system
Increased intensity in PT training

Lessons Learned:
Patient miscommunication with professionals
Multiple Ailments
Family stress/Financial Concern

RISKS AND CHALLENGES

-Insufficient experience

-Group size

-Spanish fluency

-Ethical concern

-Lack of funding

VS

SOLUTIONS

-Field trips

-Time Management

-Ethical Compliance Coordinator

-Expert Review

ACCOMPLISHMENTS

-Case Studies

Pediatric Patient Case Study

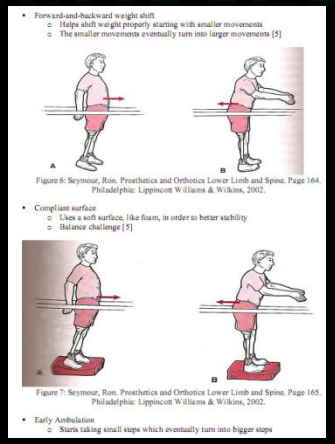
Executive Summary

The following case study details the treatment process and the specialists involved in treating Miguel Alejandro Torres, a seven year old orphan who was born in Armenia, Colombia and was born with limb deficiency which led to a trans-tibial amputation (an amputation below the knee). After being adopted and brought to the United States, Miguel goes through a treatment a treatment process dealing with several specialists, all with different scopes of practice, but who nonetheless have to work together in order properly treat Miguel. The case study details the treatment offered by each specialist including, the pediatrician, the orthotic and prosthetic technician, and the physical therapist. It details the points of view of each member as well as the methods used to treat Miguel. The case study also shows the financial considerations that had to be taken into account by the Miguel's newly adoptive parents in order to pay for all of the specialists' services. As the treatment process develops, several difficulties are encountered by the patient and his family due to lack of communication between the treatment specialists. These difficulties are discussed in detail in order to emphasize the importance of communication between all of the different specialists and in contrast, how poor communication deteriorates the quality of life as well as the treatment of the patient.

Background History of Patient

For all general purposes, our patient, his diagnosis and his history are all fiction. However, the situations that him and his family will encounter as the treatment process proceeds are by all means, very realistic to what someone in a similar situation could potentially face when being treated. Our patient's story starts in 2002, in Armenia, Colombia. This is three years after a massive earthquake destroyed most of the town, leaving many citizens homeless, and with no clue as to where to ask for help.

Picture of Miguel at age 5



- Forward-and-backward weight shift
  - Helps shift weight properly starting with smaller movements
  - The smaller movements eventually turn into larger movements [5]

Figure 6: Seymour, Ron. Prosthetics and Orthotics Lower Limb and Spine. Page 164. Philadelphia: Lippincott Williams & Wilkins, 2002.

- Compliant surface
  - Uses a soft surface, like foam, in order to better stability
  - Balance challenge [5]

Figure 7: Seymour, Ron. Prosthetics and Orthotics Lower Limb and Spine. Page 165. Philadelphia: Lippincott Williams & Wilkins, 2002.

- Early Ambulation
  - Starts taking small steps which eventually turn into bigger steps

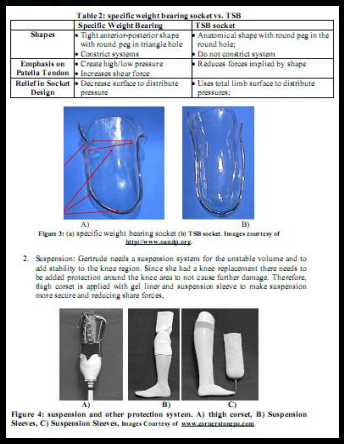


Table 2: specific weight bearing socket vs. TSB

	Specific Weight Bearing	TSB socket
Shapes	• Tight anterior-posterior shape with round peg in triangle hole • Constrict systems	• Anatomical shape with round peg in the round hole; • Do not constrict system
Emphasis on Patella Tendon	• Create high/low pressure • Increases shear force	• Reduces forces implied by shape
Relief in Socket Design	• Decrease surface to distribute pressure	• Uses total limb surface to distribute pressure;

A) B)

Figure 3: (a) specific weight bearing socket (b) TSB socket. Images courtesy of http://www.oandp.org

2. Suspension: Gertrude needs a suspension system for the unstable volume and to add stability to the knee region. Since she had a knee replacement there needs to be added protection around the knee area to not cause further damage. Therefore, thigh corset is applied with gel liner and suspension sleeve to make suspension more secure and reducing share forces,

A) B) C)

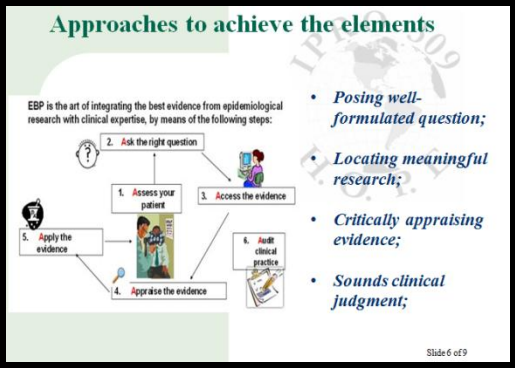
Figure 4: suspension and other protection system. A) thigh corset, B) Suspension Sleeves, C) Suspension Sleeves, Images Courtesy of www.ourcrutches.com

-Presentations

Training

- Gait Training – teaching better ambulatory practices (how to walk properly)
- Strengthening exercises
- Weight transfer
- Going up and down stairs
- Range of motion improvement
- Aerobic conditioning

CMC gait training on the parallel bars wearing knee-ankle-foot-orthoses.



Approaches to achieve the elements

EBP is the art of integrating the best evidence from epidemiological research with clinical expertise, by means of the following steps:

2. Ask the right question
1. Assess your patient
3. Access the evidence
5. Apply the evidence
6. Audit clinical practice
4. Appraise the evidence

- *Posing well-formulated question;*
- *Locating meaningful research;*
- *Critically appraising evidence;*
- *Sounds clinical judgment;*

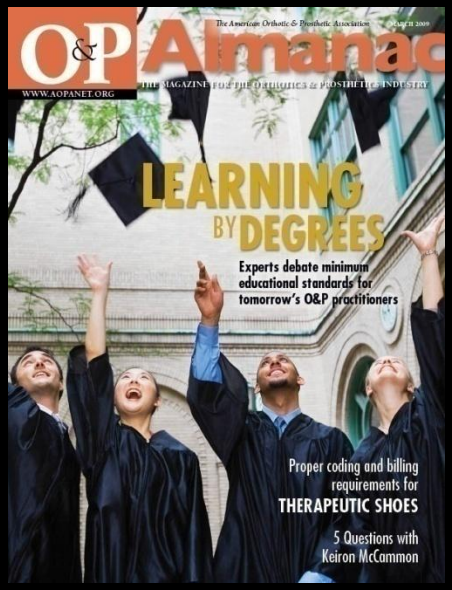
Slide 6 of 9

-Translation of material to Spanish

IMPACTS

-Help Centro Don Bosco to achieve ISPO accreditation

-Helped O&P students understand the different roles and improve the patient treatment process



FUTURE DIRECTION

-Attend conference and present in Bogota May 2009

-Assess and design business plan to sustain the O&P program in Centro Don Bosco

AFFILIATIONS

COMITE INTERNATIONAL GENEVE
ICRC

JOLIET Junior College

ROTARY INTERNATIONAL

Bio Concepts
orthotic prosthetic center

Q&A