Erasmus+

Development of innovative training solutions in the field of functional evaluation aimed at updating of the curricula of health sciences schools

TEACH

MODULE FOUNDATIONS

Didactic Unit D: TECHNIQUES FOR THE INSTRUMENTAL ANALYSIS OF MOVEMENT AND FORCES

D.2 How can forces be measured and which parameters can be analyzed? What are its main applications?

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CLASS INDEX

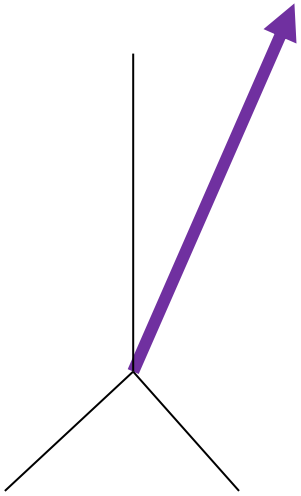
- How can I measure forces? Principal Techniques for instrumental analysis in Biomechanics.
- Case study.
- Main ambits of application and examples.

- **Class Workshop**

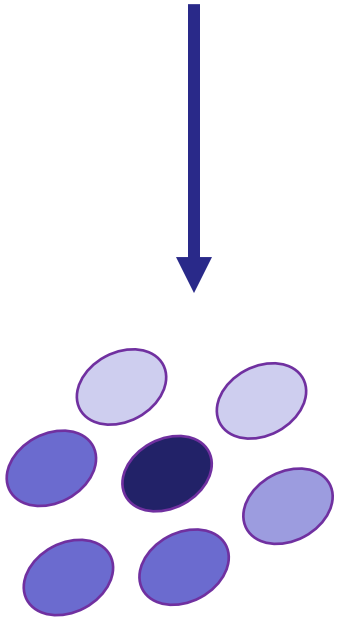
Measuring Forces

Different Techniques used in Biomechanics for Forces Analysis

Reaction Forces



Pressures



Muscular Force

Case study

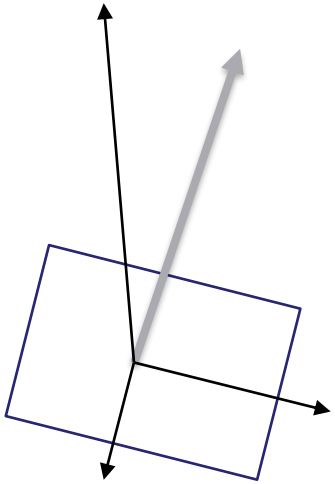
Hallux valgus

Introduction: Hallux valgus (HV) is a bone deformation over the first ray of the foot. Biomechanics of the foot can be altered in a greater or lesser extent depending on the degree of acquired deformity.
It can also produce pain and cause difficulties for normal gait.
New solutions have been adopted in surgery to avoid these problems. One of them is the minimally invasive correction through percutaneous techniques.
The main goal of this hallux valgus surgery is the morphologic and functional rebalance of the first metatarsophalangeal joint and first ray.

Hypothesis: this new technique is able to reduce biomechanics changes due to HV and improve functionality.

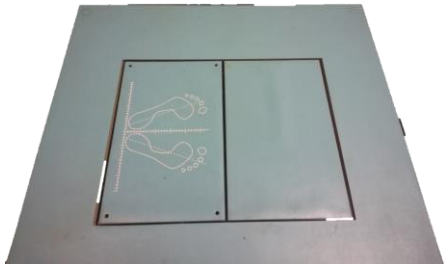
Objectives: Find out the effectiveness of this technique regarding functional improvements trough a clinical gait analysis, by studying both forces and pressures produced during this activity.
For that, a case study of a subject with HV deformation (mild degree) is presented.

Methods



Reaction Forces

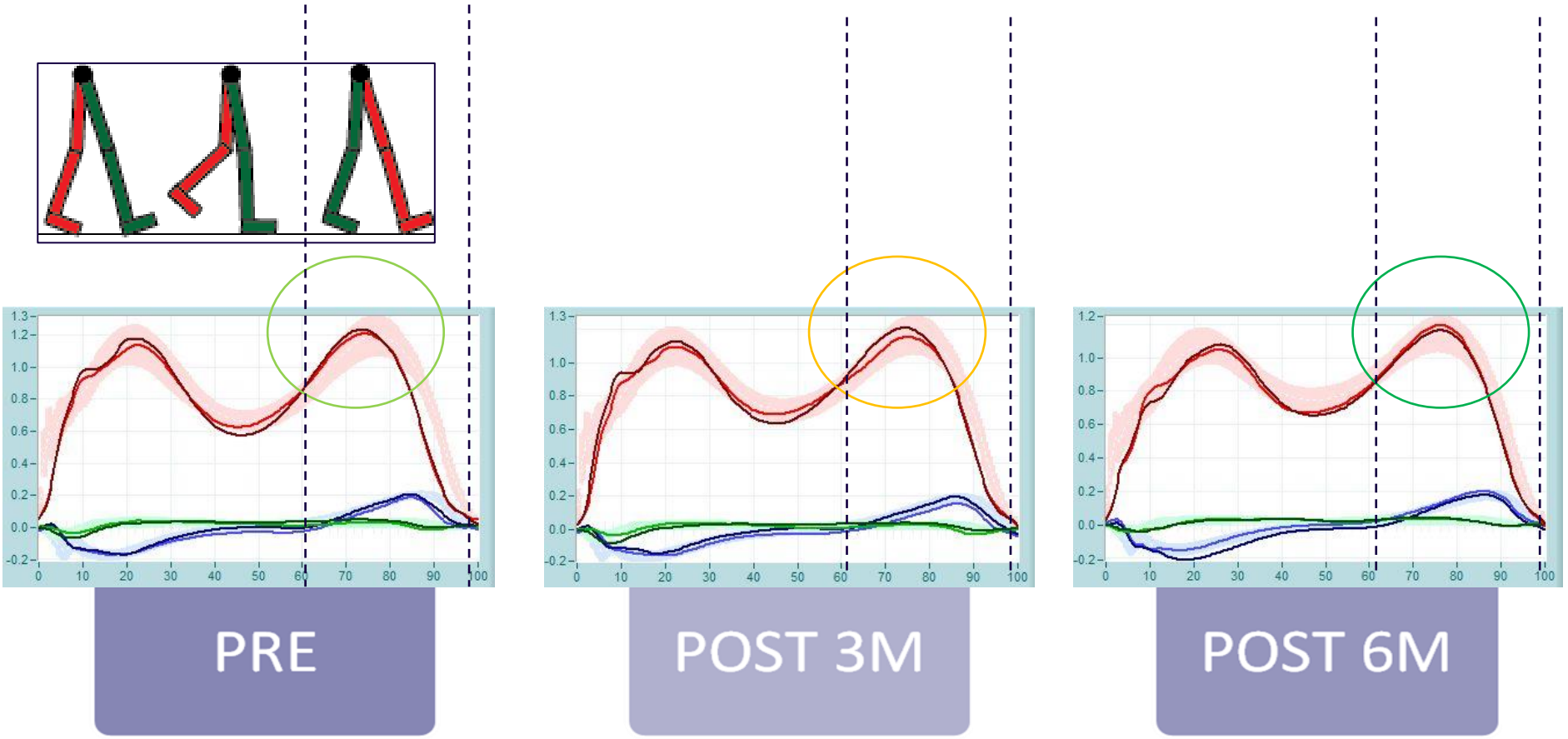
Pressures



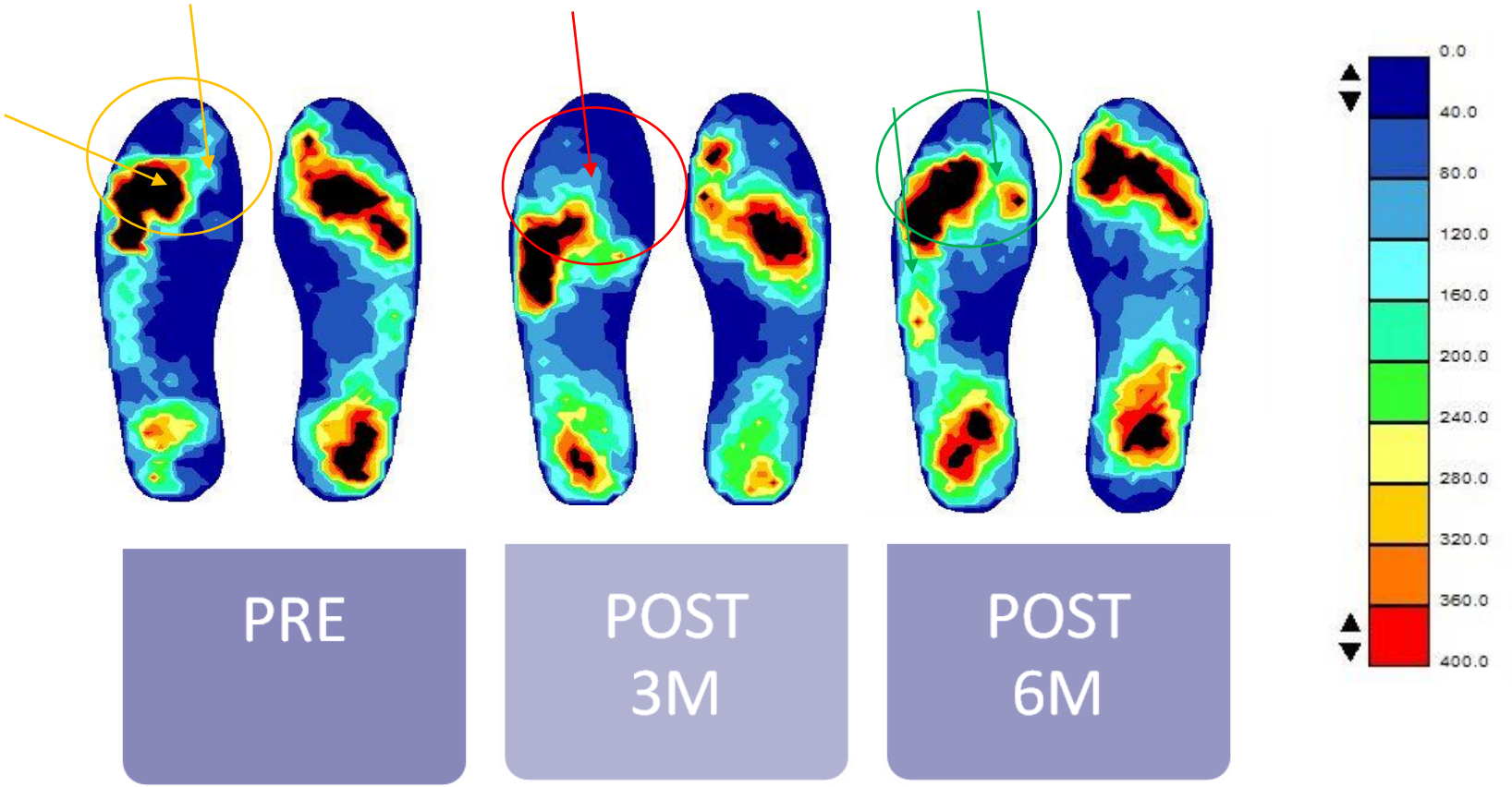
Force platform

Pressure insoles

Gait Reaction Forces



Gait Pressure Distribution

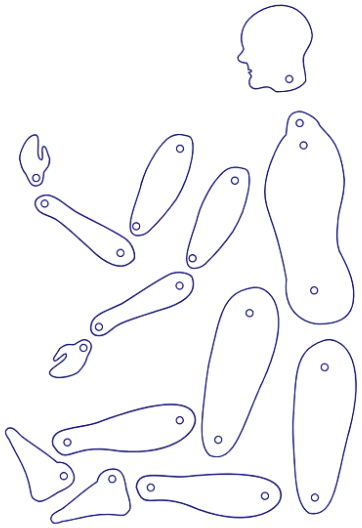


Case Study: conclusions

- The use of dynamometric platforms shows no alteration of functional performance of gait during the whole period studied.
- Pressure insoles results show significant modifications of pressure distribution during the study, mainly regarding first ray.
- A better pressure distribution is observed after the surgery.

Measuring Forces

Areas of interest and examples of application



Class Workshop

Workflow

1st. Matching Up !!

Couple 1. Jane and Peter: The Incredibles
Couple 2. John and Will: The Outsiders
Couple 3.
4. …
5.
6.
7.
8.
9.
10.

Class Workshop

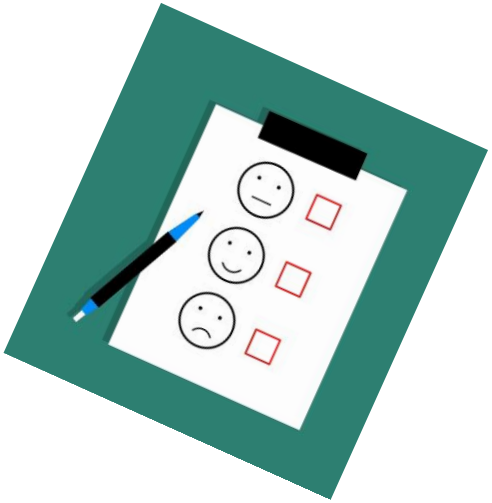
Workflow

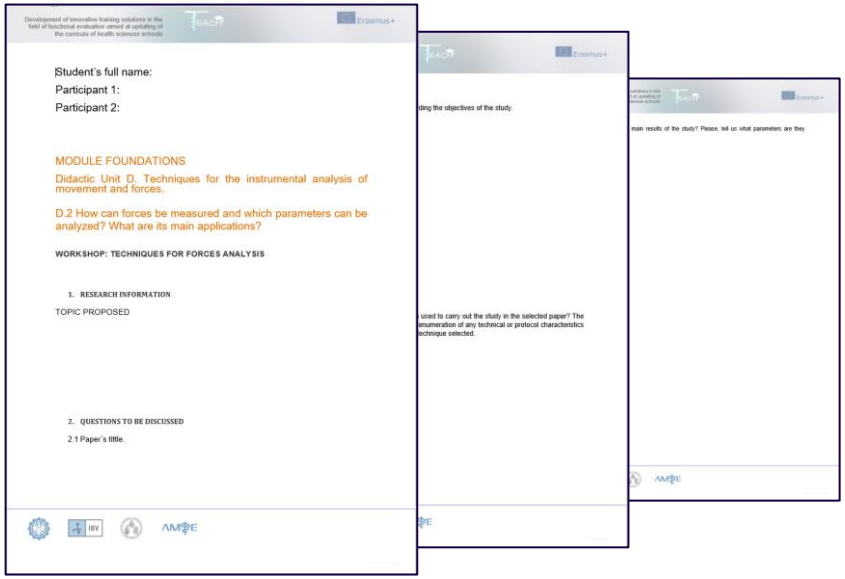
2nd. Topic selection …

1. Grip force in carpal tunnel síndrome. (The incredibles)
2. Lower limb weakness after ACL surgery. (The Outsiders).
3. …
4.
5.

Class Workshop 1
Workflow

3rd. Fill the worksheet





Student's full name:
Participant 1:
Participant 2:

MODULE FOUNDATIONS
Didactic Unit D. Techniques for the instrumental analysis of movement and forces.

D.2 How can forces be measured and which parameters can be analyzed? What are its main applications?

WORKSHOP: TECHNIQUES FOR FORCES ANALYSIS

1. RESEARCH INFORMATION

TOPIC PROPOSED

2. QUESTIONS TO BE DISCUSSED

2.1 Paper's tittle.

Class Workshop 1

Workflow

4th. Present your results

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