



"Basics in motion analysis "

Milan, September 10-21 Sept 2007

The Motion Analysis Lab (MAL)



Topics of this talk

- 🇪🇺 The quantitative evaluation of the movement analysis;
- 🇪🇺 Equipments and methods for the movement evaluation;
- 🇪🇺 Description of "Luigi Divieti Lab".



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Introduction


QUANTITATIVE MOVEMENT ANALYSIS

Medicine

Engineering




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Why a Gait Analysis Lab ?

Movement analysis from video recording: advantages and limits




→

-  Qualitative kinematics
-  2D (sagittal and frontal planes)
-  No information about forces and muscular activity




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The aim of 3D movement analysis

To give objective data of **3D kinematics**, **kinetics**
and **EMG**



Integrated Multifactorial Movement analysis



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The equipment

For the evaluation of 3D Kinematics

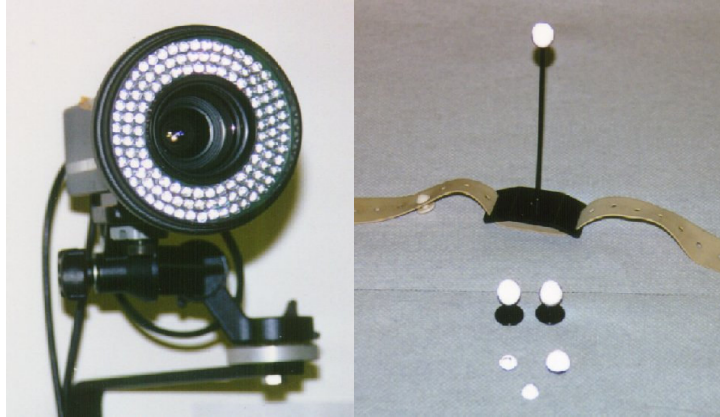


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The equipment



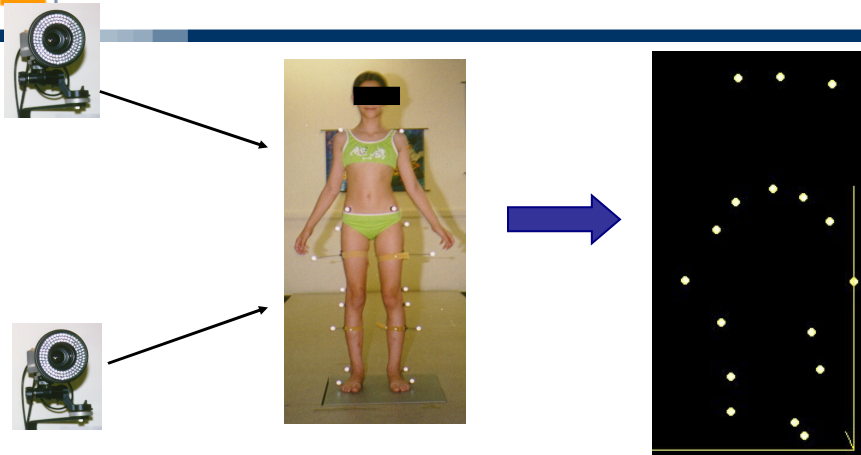
Optoelectronic System (ELITE 2002)



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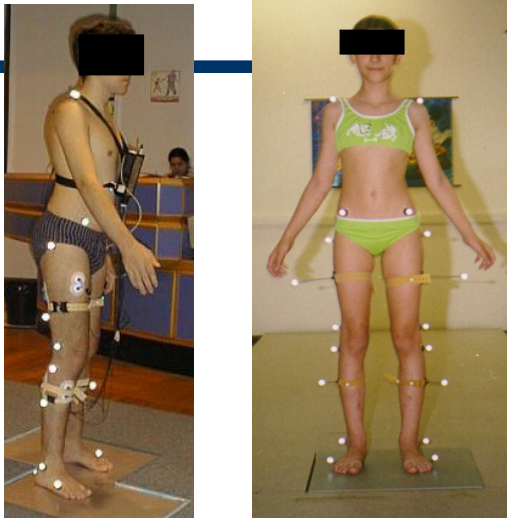


The equipment






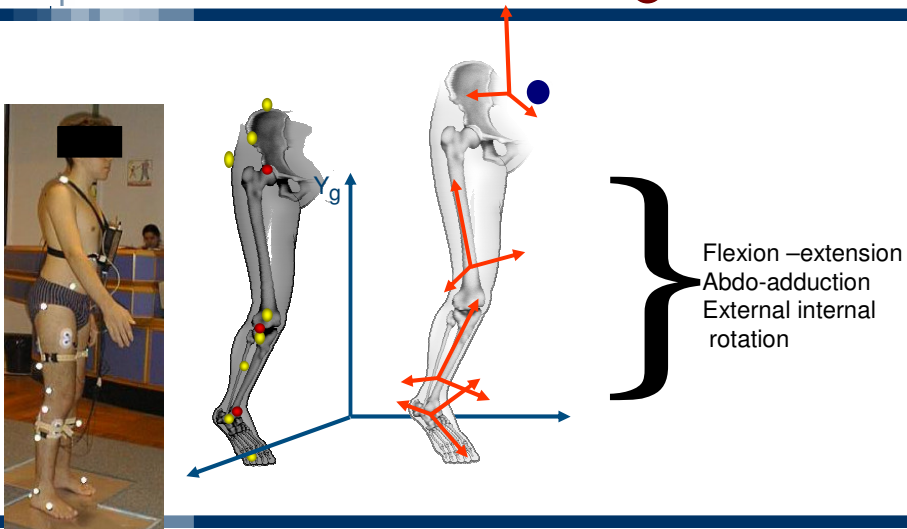
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Marker Positioning



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 Marker (on the body surface) → ● (yellow)
 Virtual Marker (centre of rotation) → ● (red)

Flexion –extension
 Abdo-adduction
 External internal rotation



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Measurements of anthropometric parameters

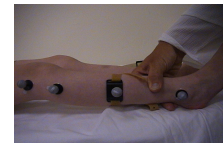
Weight		Stature	
Height		Arm length	
Pelvis width		Leg length	
LT		RT	
Pelvis Height			
Knee Diameter			
Ankle Diameter			
Leg Length			
Notes			



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Be careful in anatomical protocols!!

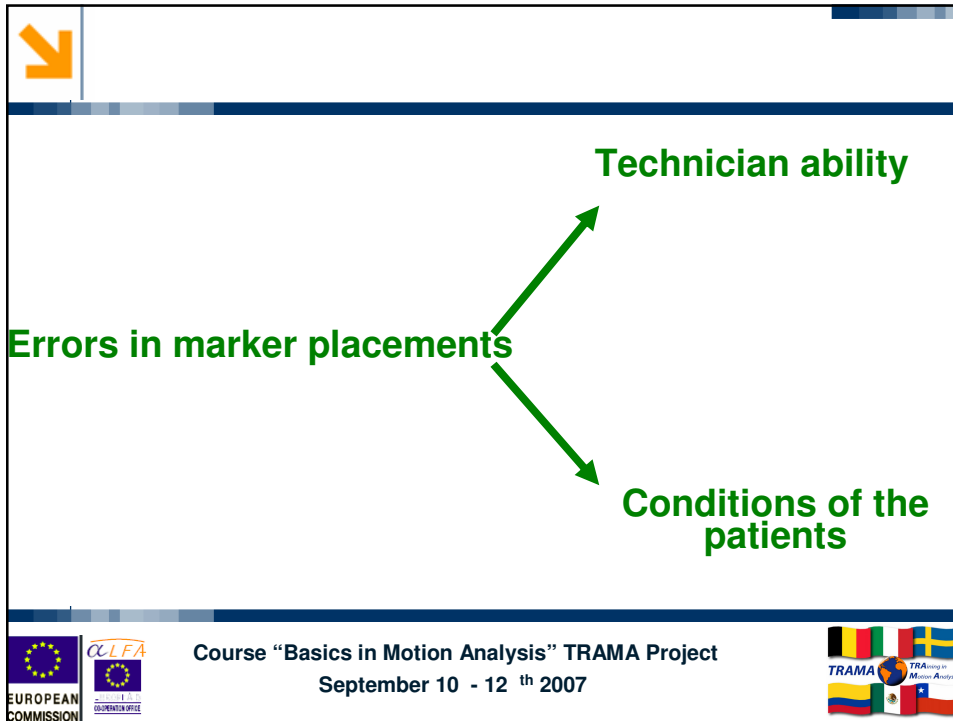


Errors in marker placement



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-
- ↓
- Errors related to Technician ability**
- Inter-operators marker placement
 - Intra-operator marker placement
- EUROPEAN COMMISSION CCLFA Course "Basics in Motion Analysis" TRAMA Project September 10 - 12th 2007
- TRAMA TRAMA in Motion Analysis
- The slide is titled 'Errors related to Technician ability' and lists two types of errors: 'Inter-operators marker placement' and 'Intra-operator marker placement'. It features the same footer as the first slide, including logos and course information.



Errors related to conditions of the patients



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deformities



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Errors related to patient conditions

....to much "fat"

....to much "small"

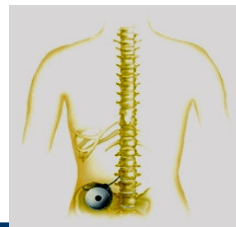
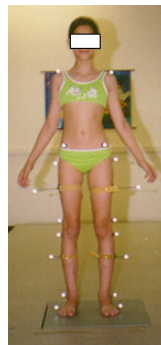


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Errors related to patient conditions

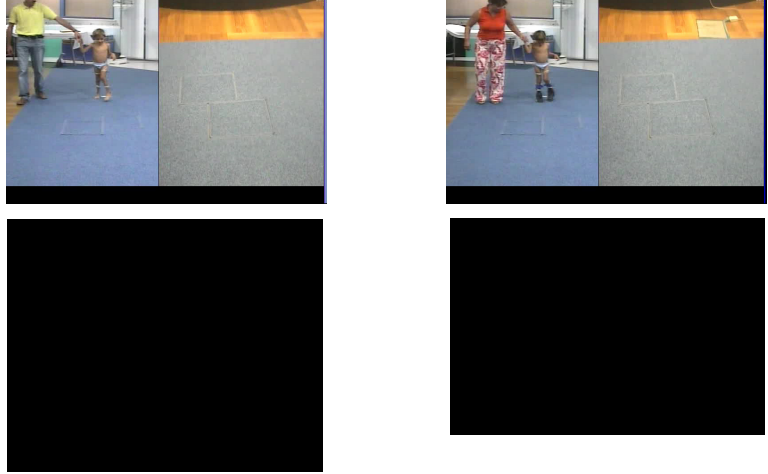
ITBaclofen






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 **Errors related to task conditions**





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 **Errors related to task conditions**





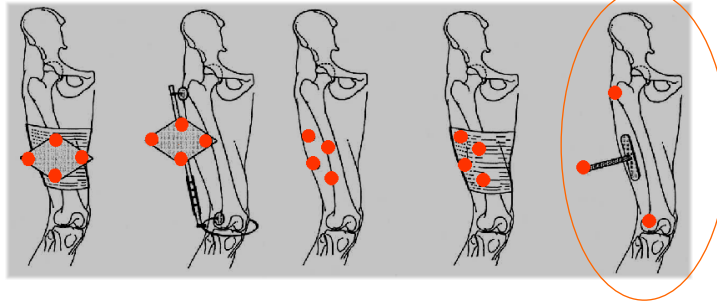
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We can distinguish ...

Technical protocols

Anatomical Protocols

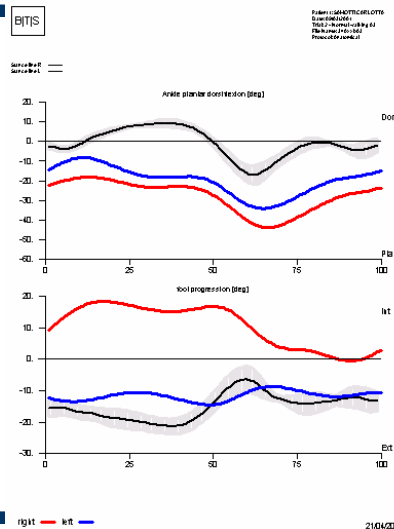
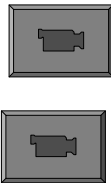


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The 3D representation

Video



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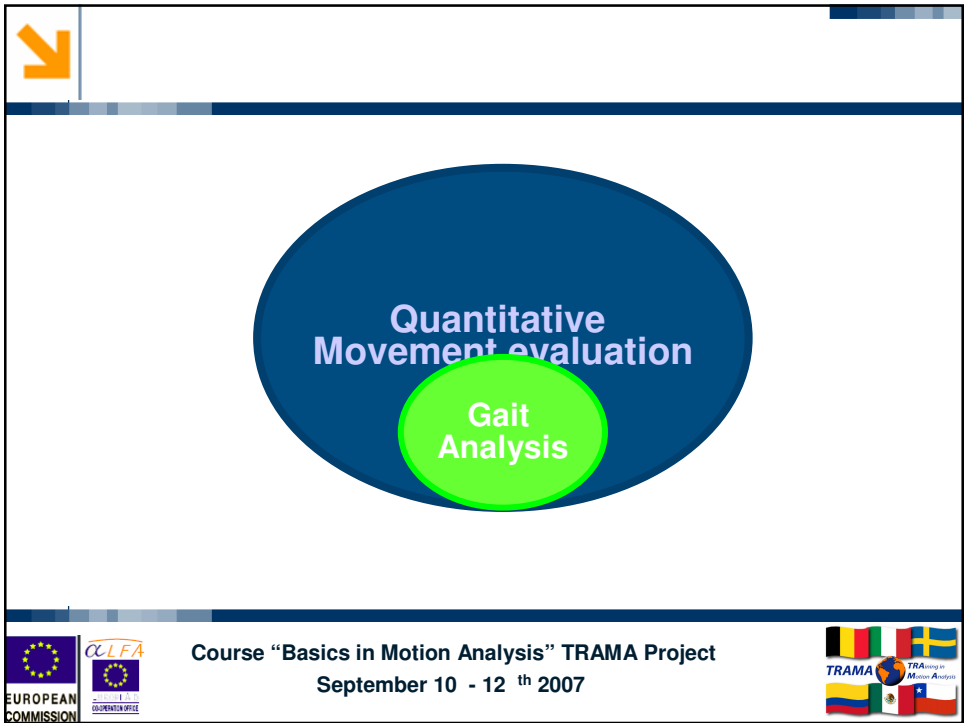
Quantitative Movement evaluation

Gait Analysis


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TRAMA TRAMA in Motion Analysis



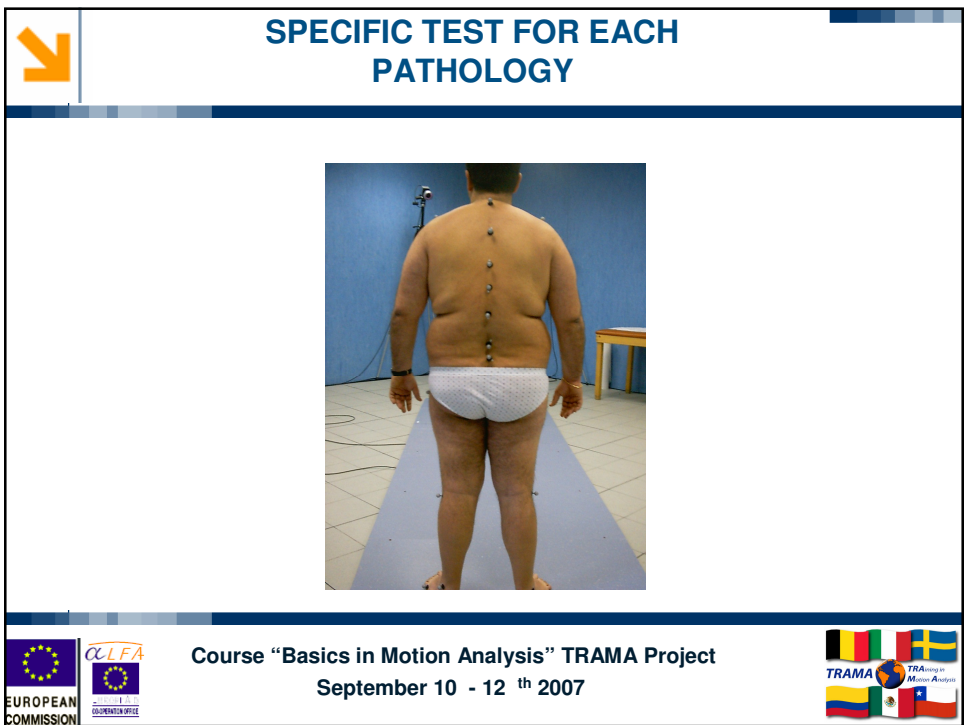
SPECIFIC TEST FOR EACH PATHOLOGY



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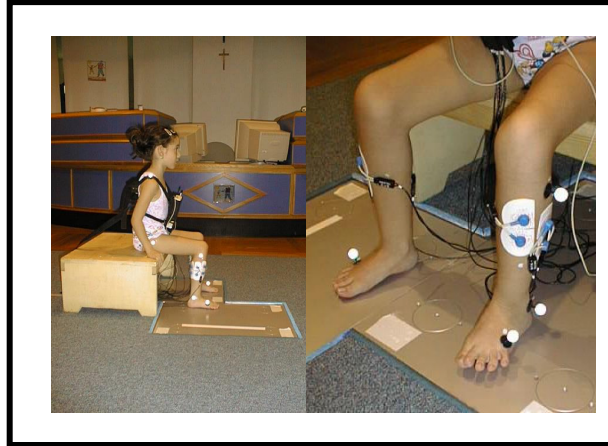
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TRAMA TRAMA in Motion Analysis





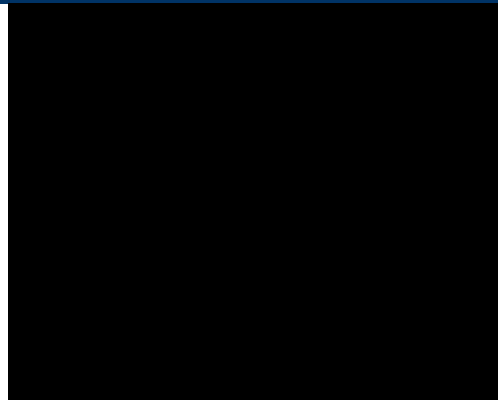
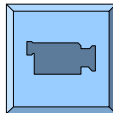
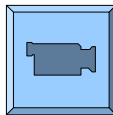
SPECIFIC TEST FOR EACH PATHOLOGY



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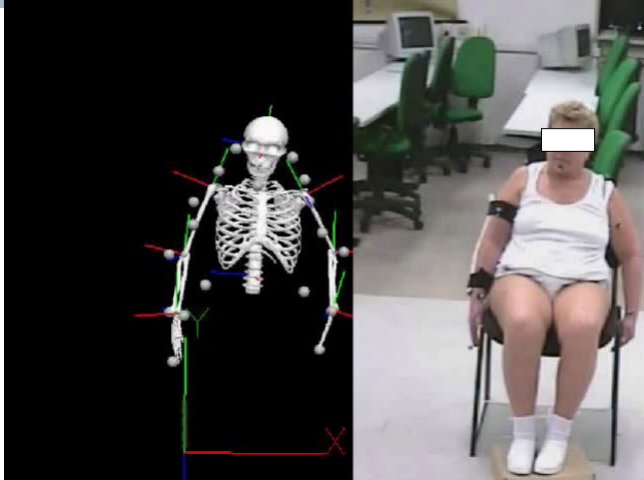
SPECIFIC TEST FOR EACH PATHOLOGY




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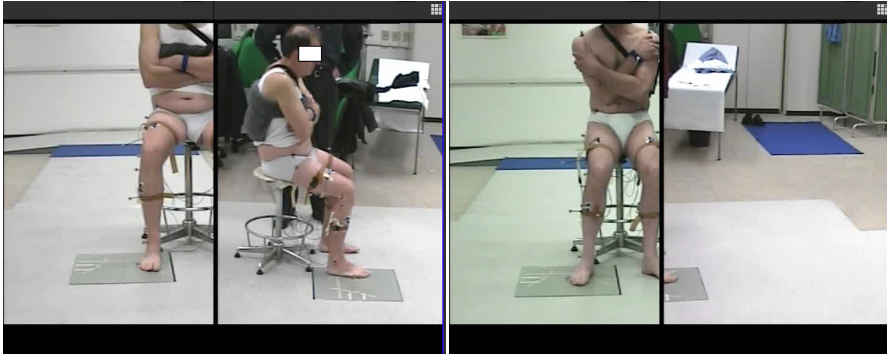


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SPECIFIC TEST FOR EACH PATHOLOGY:
Sit To stand






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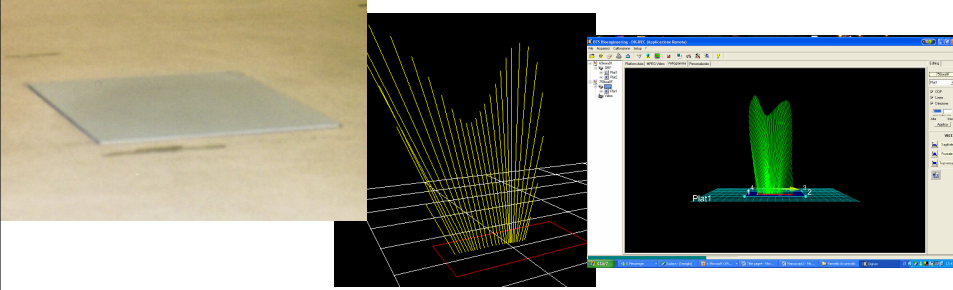



The equipment

For the evaluation of 3D Kinetics




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Force platforms

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Equipment for Kinetics

Forces,
Joint internal
Moment,
Power

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(SWAY, BTS it)

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The equipment

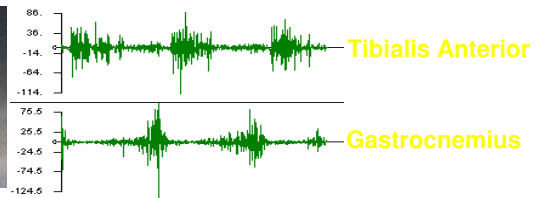
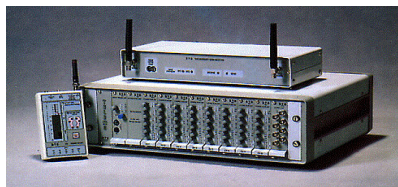
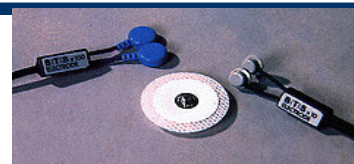
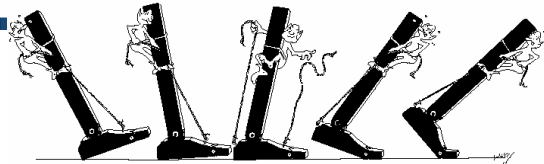
For the evaluation of EMG



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The equipment

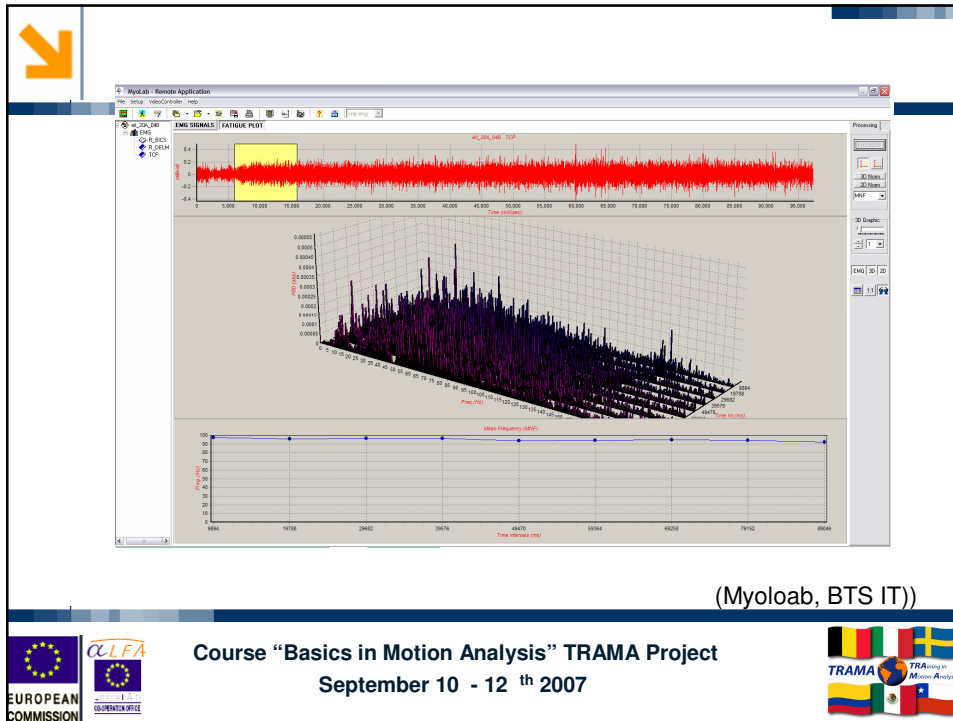


Equipment: EMG






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The equipment

To give objective data of 3D kinematics,
 Kinetics, EMG and **Video**

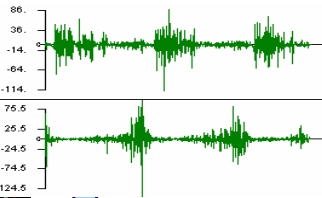
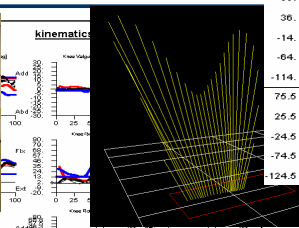
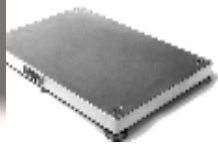


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Conclusions

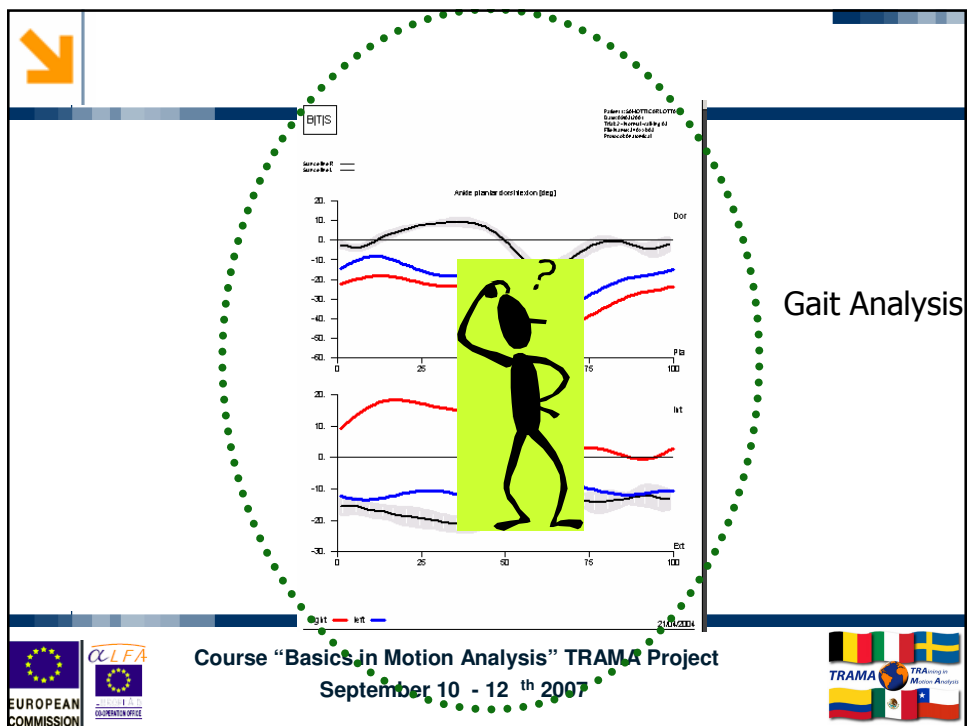


REPORT



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Since clinical decisions are based on the output of gait analysis models, we should be cautious when interpreting our data.




"The effective use of movement analysis in a professional context depends on the universal agreement on parameter definitions, conventions and terminology"


Davis et al. (1997)





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Thank you

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 Video	 Video
 Pdf	 Pdf

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