TRAMA: RESULTS EVALUATION

INTRODUCTION

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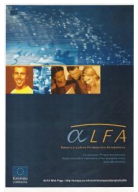
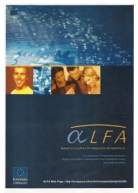
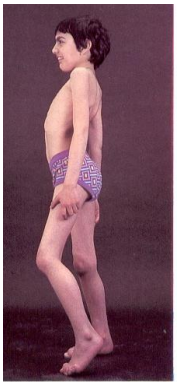


Clinical Framework

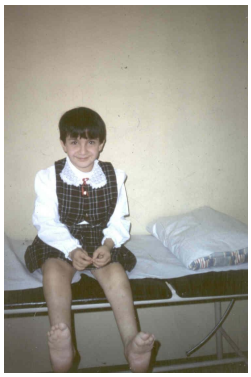


Our Experience: Establishment of gait profile of our patients

Duchenne Muscular Dystrophy



Myelomeningocele



Gait Profile of our Patients

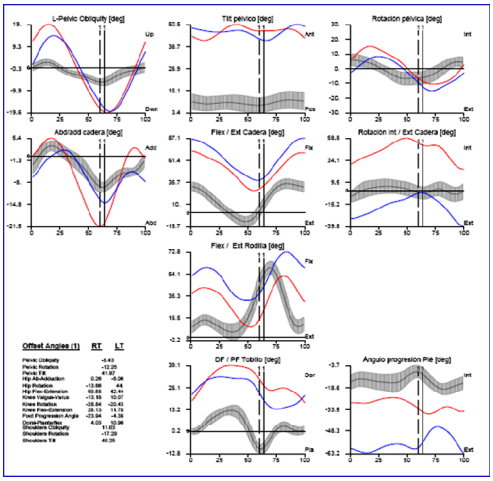
Objectives

- Better understanding of the alterations mentioned in literature
- Determinate if the alterations found, are as described in literature (limited information)
- Analyse the evolution of our patients and compare with literature
- Establish profiles prior to treatment
- Help to improve rehabilitation and surgical treatments

Myelomeningocele: Gait Profile

Myelomeningocele Lumbar- Sacral Level

- Pelvis:
  - Increase ofthe oscillation in the coronal plane
  - Increase ofthe pelvic forward tilt in the sagittal plane
  - Increase of the pelvic rotation in the horizontal plane
- Hips
  - Flexion increased
- Knees:
  - Flexion increased in the Initial Contact
  - Less range of motion
- Ankles:
  - Dorsal Flexion increased



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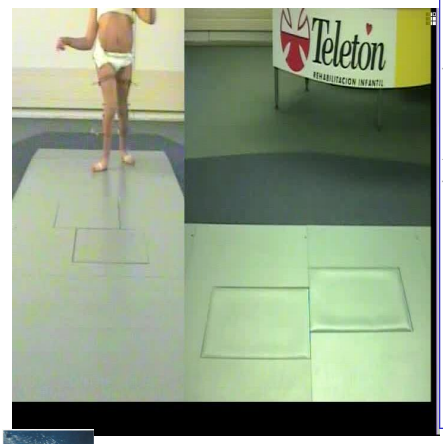
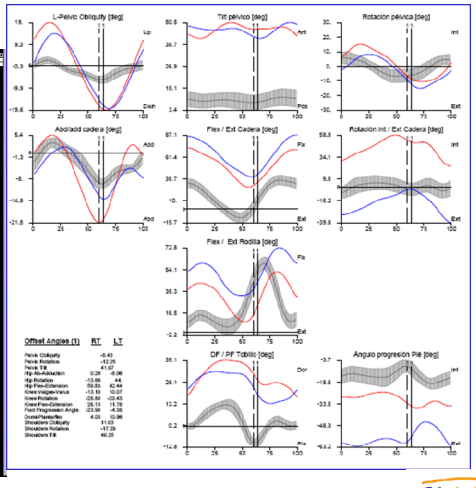
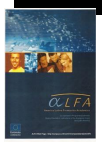
Myelomeningocele L3

TRAMA
TRAining in Motion Analysis







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Myelomeningocele L4 – L5

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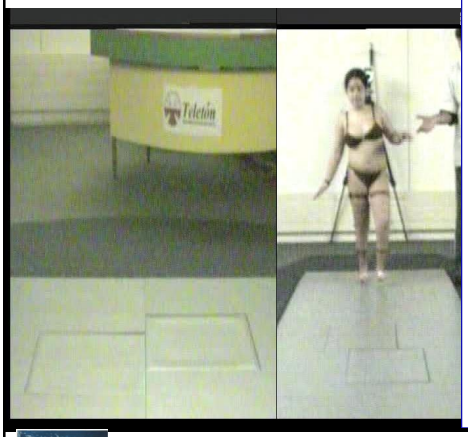
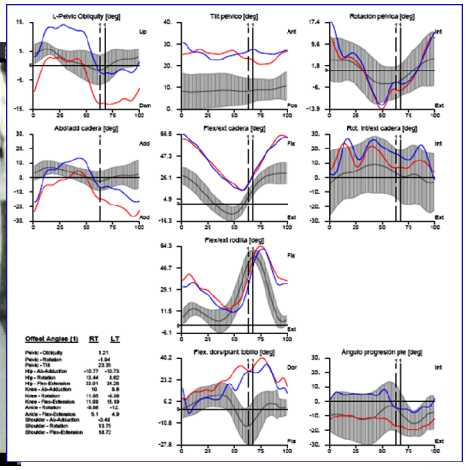
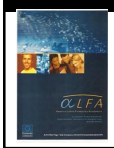
TRAining in Motion Analysis







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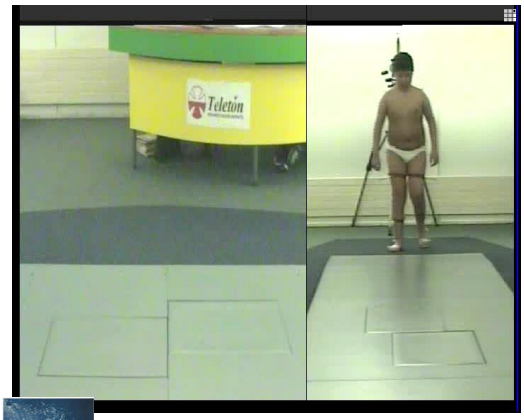
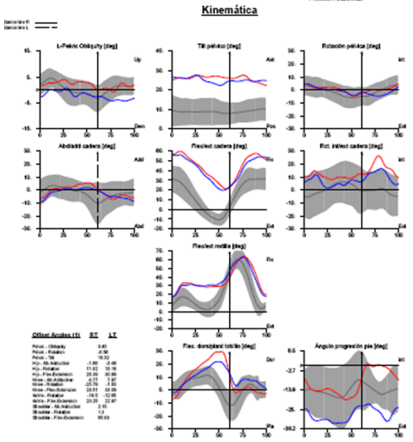
Myelomeningocele S1

TRAMA TRAining in Motion Analysis

P. A. 1127xa03MMC S1





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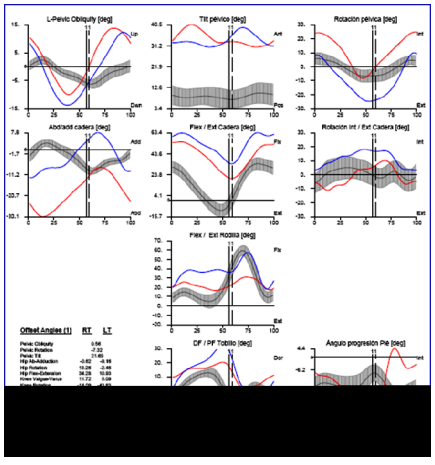
Myelomeningocele asymmetrical L3 to Left and L4 to Right

TRAMA TRAining in Motion Analysis



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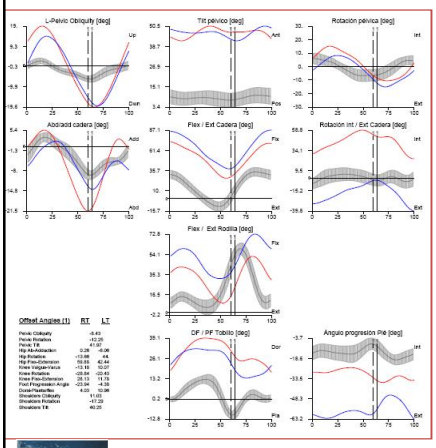
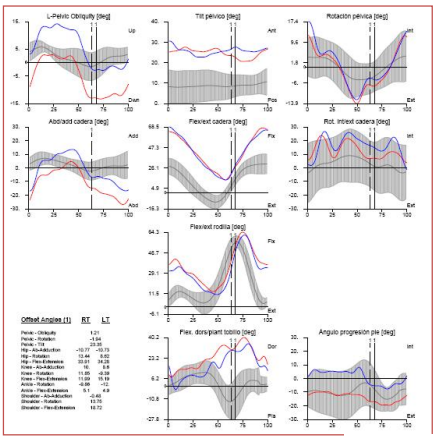
Myelomeningocele according level

L3

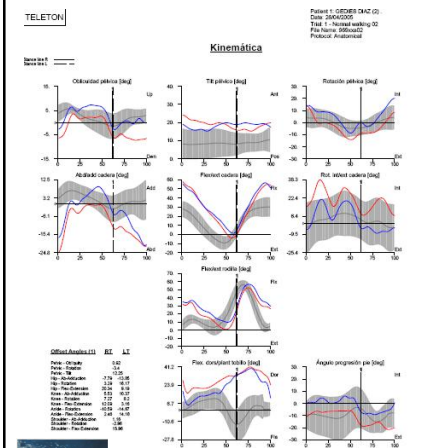


L4 - L5

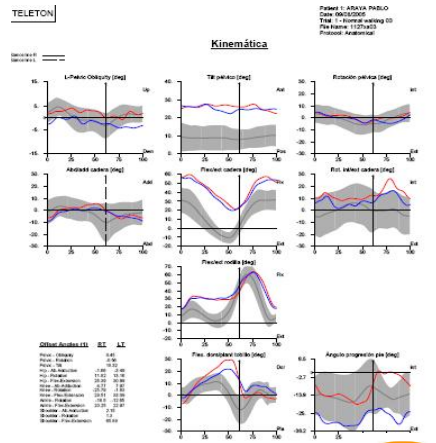


Myelomeningocele according level

L5



S1



Myelomeningocele

- The result that we see in our experience agree with findings published in literature
- As the injury level is lower, these alterations decreases at:
  - Pelvis
  - Hips
  - Knees
  - Ankles
- The surgeries performed in our patients did not change their kinematic profile
- In children with asimetric level, the kinematic of the contralateral side is affected too as a compensatory phenomena

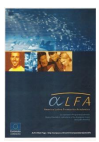
Myelomeningocele

Finding of an index of global evaluation, that will allow us to:

- Visualize in a curve, the kinematics characteristics of the gait of a patient, at the pelvis, hip, knee and ankle, at the sagital, frontal and transversal plane.
- Compare this characteristics with the normal subjects and, establish a correlation index, between the level lesions and the normal gait.
- Establish the magnitude of the difference, between normal gait and the gait of our patients.
- Messure the impact of therapies in the kinematic of all the articular points,that were evaluated at the same time, in a graphic and in a cuantitative way.
- Try to identify, if there are some kinematic points that are more representative than others, this will allow to acomplish evaluation with a reduced number of points.

CORRELATION COEFICIENT

Z SCORE



CORRELATION COEFFICIENT

Compare in a cuantitative way two group of parameters, that are represented in an curve with identical physical magnitude.

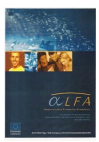
Z SCORE

Measures the dispersion of each point of the patient curve in SD.

From 19 points of 7 curves of the Kinematic Data, we build:

CORRELATION COEFFICIENT

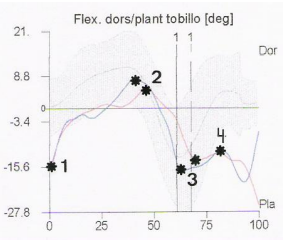
Z SCORE



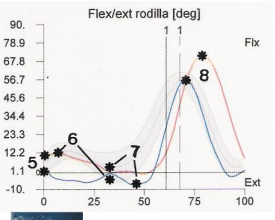
Point of kinematic data

1) Ang of Ankle at initial contact
2) Peack Ankle dorasl flexion support phase
3) Ang of Ankle in Toe off
4) Ang of maximla dorsal flexion of ankle in swing phase.
5) Ang of Knee at initial contact .
6) Peak of knee at the loading response.
7) Ang of mínimal knee flexion at middle support.
8) Peack of máximal knee flexion in swing phase.
9) Ang of hip flexion at initial contact .
10) Ang of minimal hip flexion in midle support.
11) Ang of maximal hip flexion in swing phase.
12) Ang of pelvic at initial contact in frontal plane.
13) Peack of pelvic down in midle support.
14) Peack of pelvic up during swing.
15) Ang of pelvic rotation of pelvis at initial contact. (+ Internal rotation, - external rotation)
16) Ang of pelvic rotation in middle support. (+ Internal rotation, - external rotation)
17) Ang of pelvic rotation in terminal swing.
18) Ang of pelvic tilt at initial contact.
19) Ang of hip abb/add in support phase.

Ankle and knee

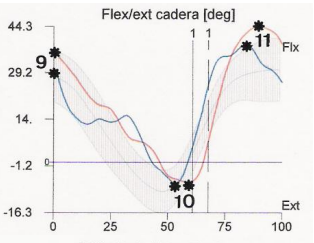


1) Ang of Ankle at initial contact
2) Peack Ankle dorsal flexion during support phase
3) Ang of Ankle in toe off
4) Ang of maximal dorsal flexion of ankle in swing phase.

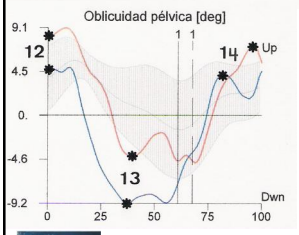


5) Ang of Knee at initial contact .
6) Peak of knee at the loading response.
7) Ang of mínimal knee flexion at middle support.
8) Peack of máximal knee flexion in swing phase.

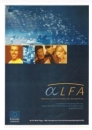
Hip and Pelvis



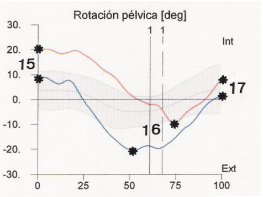
9) Ang of hip flexion at initial contact .
10) Ang of minimal hip flexion in midle support.
11) Ang of maximal hip flexion in swing phase.



12) Ang of pelvic at initial contact in frontal plane.
13) Peack of pelvic down in midle support.
14) Peack of pelvic up during swing.

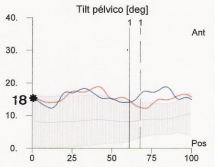


Pelvis



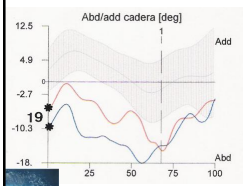
15) Ang of pelvic rotation at initial contact in the transversal plane.
(+ Internal rotation, - external rotation)

16) Ang of pelvic rotation in middle support.
(+ Internal rotation, - external rotation)



17) Ang of pelvic rotation in terminal swing.

18) Ang of pelvic tilt at initial contact in the sagital plane.



19) Ang of hip abb/add in support phase in de frontal plane

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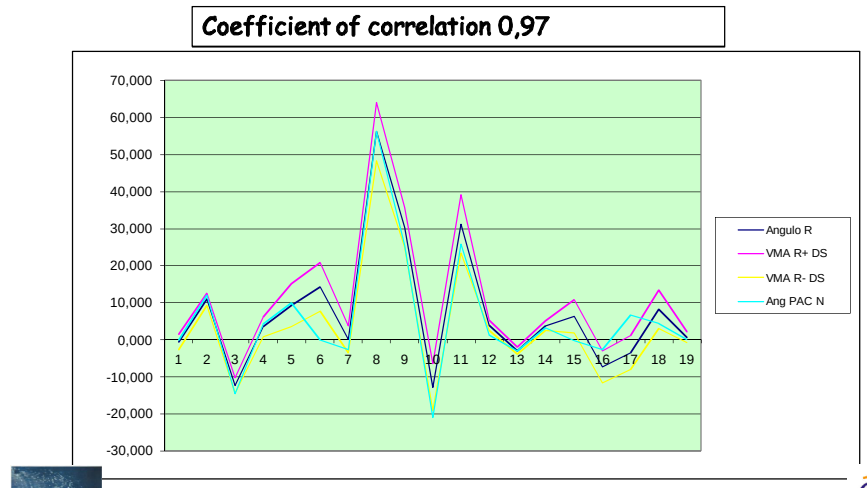
Coefficient of Correlation: Normal values and SD

TRAMA TRAining in Motion Analysis



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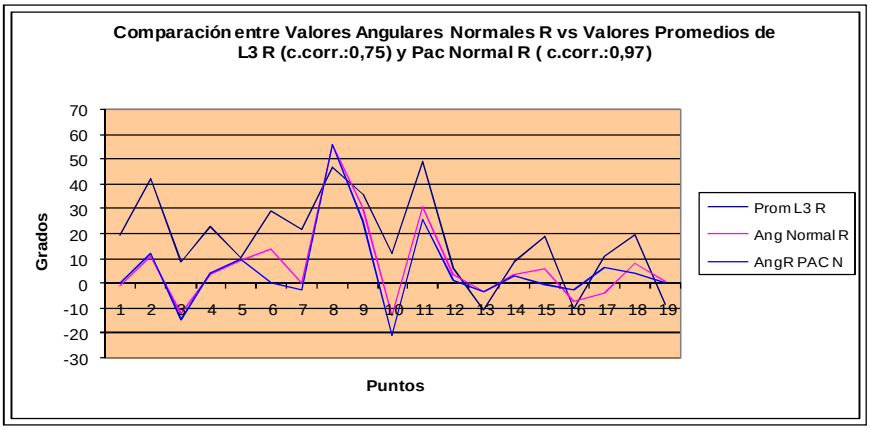
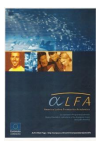
Myelomeningocele : Coefficient of Correlation L3 - vs Normal

TRAMA TRAining in Motion Analysis





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Myelomeningocele : Coefficient of Correlation S1 vs Normal

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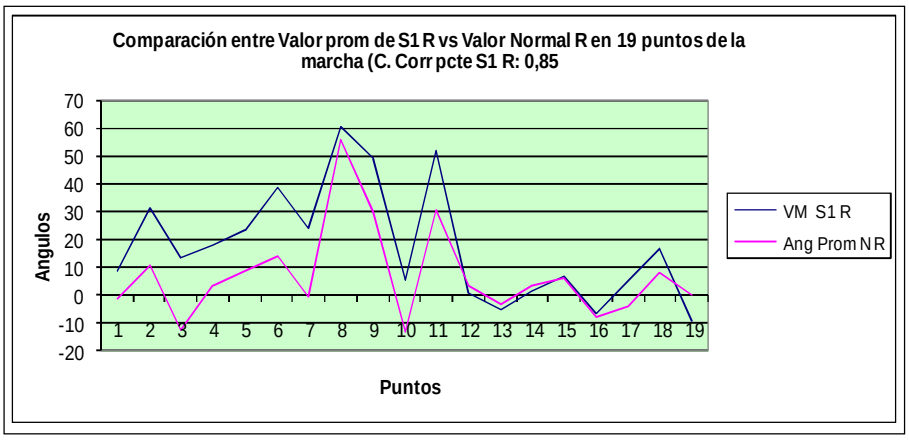

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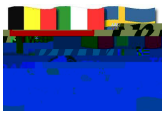
MMC : Z Score average S1 / Normal

Mielomeningocele



- There was a certain relation of the values of the Coefficients of Correlation, with the level of injury of our patients
- The Z-Score show that as the injury level is higher, were more SD of normal Z Score
- It was one case who inicially was out of this behavior, but when we re analized the patient, we could see a mistake in the initial clasification of his level lesion

The Coefficient of Correlation and Z Score could be an useful index

Thesis

Problem definition:

Myelomeningocele

- The AFO improved the gait on the Temporal and Distance Parameters and the Kinematics in sagittal plane
- The knee showed a moment of important overload at the higher levels. The use of cane as a preventive measure in the future must be considered
- The exercises would certainly benefit: velocity, cadence, anterior step lenght and the angle of anteversion of pelvis at the Initial Contact, although these improvements were not statistically significant in our experience