
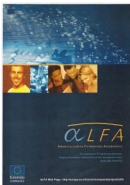
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**TRAMA**
Training in Motion Analysis


TRAMA: RESULTS EVALUATION


INTRODUCTION

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Santiago - Chile

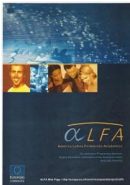
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Observational Learning Framework for Analysis



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Clinical Framework

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Our Experience:
Establishment of gait profile of our patients

Duchenne Muscular Dystrophy Myelomeningocele





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Gait Profile of our Patients


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Objectives


- ❖ Better understanding of the alterations mentioned in literature
- ❖ Determine 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

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Myelomeningocele: Gait Profile




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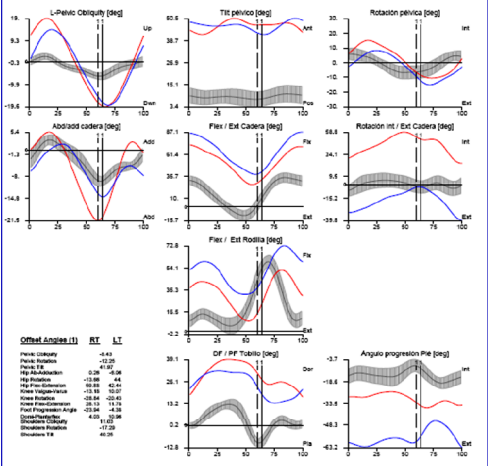
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Myelomeningocele Lumbar- Sacral Level



- ❖ Pelvis:
 - Increase of the oscillation in the coronal plane
 - Increase of the 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

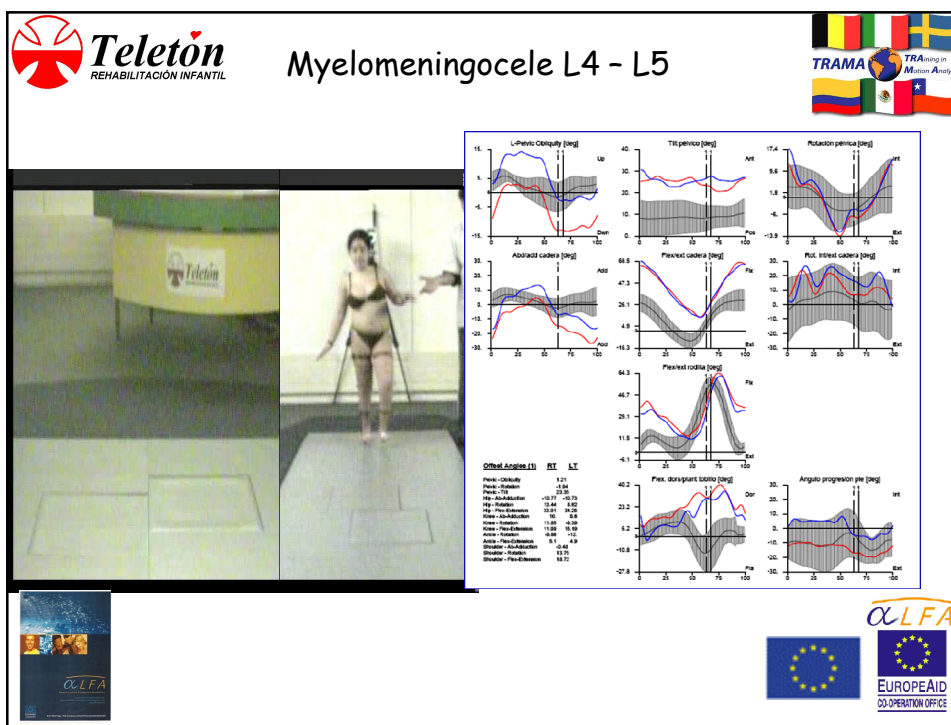
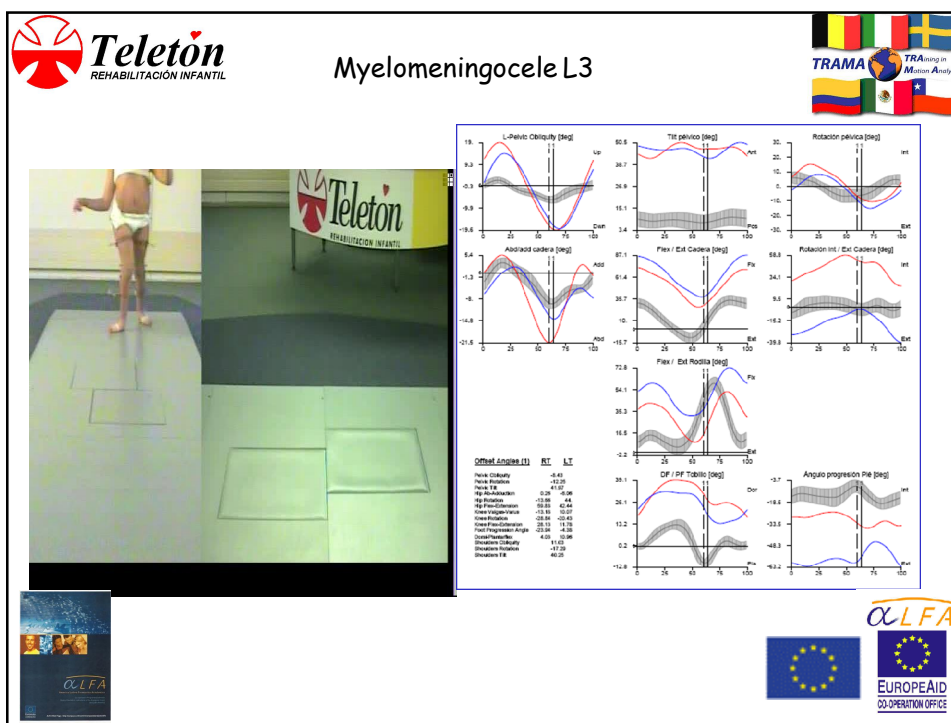


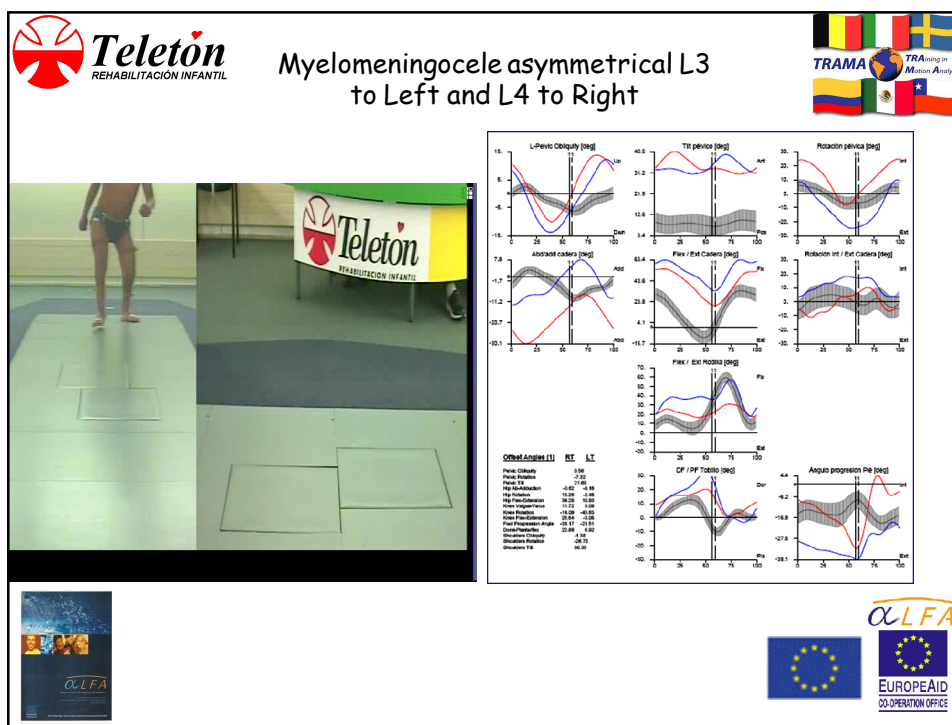
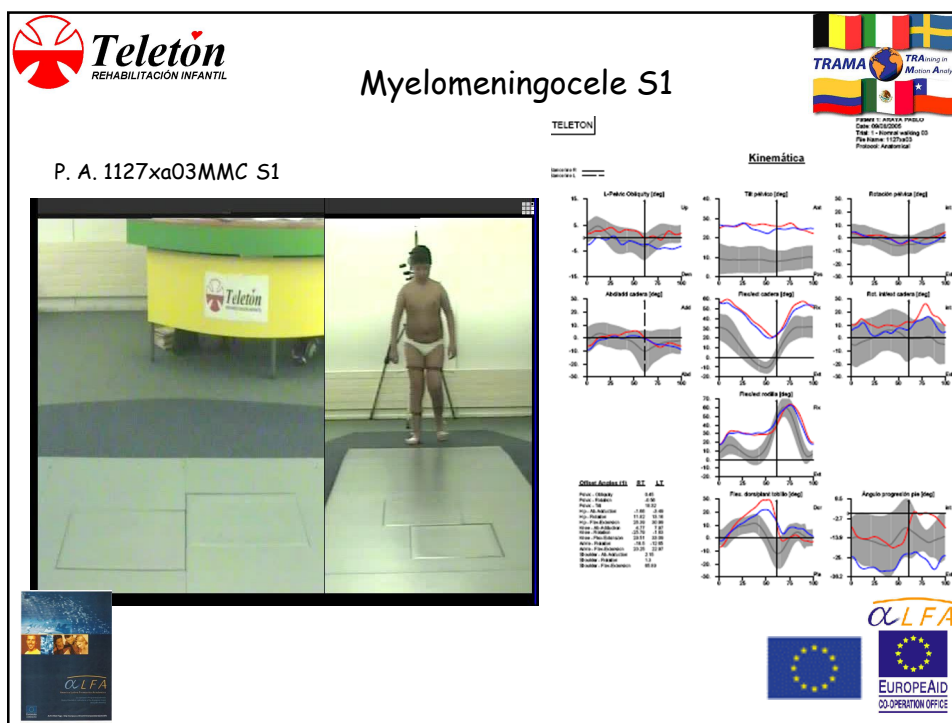
Offset Angles (°)	RT	LT
Pelvic Obliquity	-4.5	1.1
Pelvic Tilt	-22.22	-22.22
Pelvic Rot.	47.62	47.62
RP Adduction	0.28	-6.08
RP Rotation	-13.88	4.8
RP Ext. Rotation	86.86	86.86
Knee Varus/Valgus	-15.58	52.27
Knee Rotation	-128.55	-128.55
Knee Flexion/Extension	25.13	14.14
Foot Progression Angle	-13.84	-6.28
Calcaneal Tilt	4.55	11.28
Shankline Tilt	-17.33	-17.33
Shankline Rotation	80.35	80.35




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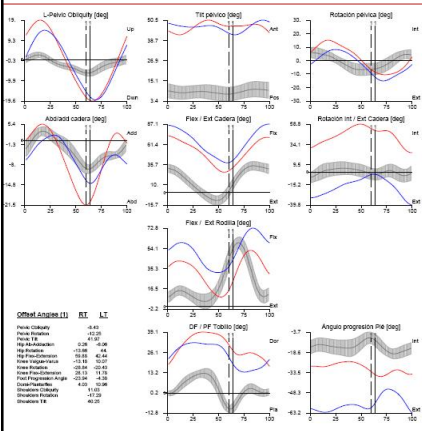
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Myelomeningocele according level



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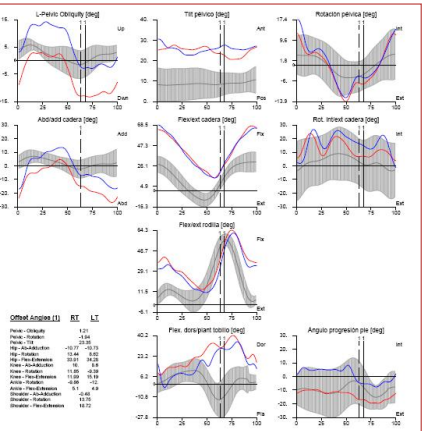
L3



Offset angles (L)


	RL	LI
Pelvic Obliquity	-8.43	0.00
Pelvic Rotation	-5.70	0.00
Pelvic Tilt	-6.17	0.00
Hip Flexion/Extension	-2.08	-6.46
Hip Abduction/Adduction	18.65	45.44
Hip Internal/External Rotation	15.18	50.00
Knee Flexion/Extension	28.15	11.15
Knee Progression/Regression	4.55	76.96
Ankle Flexion/Extension	1.73	0.00
Shank Rotation	-40.25	0.00



L4 - L5




Offset angles (L)

	RL	LI
Pelvic Obliquity	1.21	0.00
Pelvic Rotation	0.00	0.00
Pelvic Tilt	0.00	0.00
Hip Flexion/Extension	-12.17	0.00
Hip Abduction/Adduction	12.44	6.52
Hip Internal/External Rotation	10.21	74.52
Knee Flexion/Extension	11.40	-10.59
Knee Progression/Regression	12.02	76.52
Ankle Flexion/Extension	-0.00	0.00
Ankle Progression/Regression	9.1	4.9
Shank Rotation	-40.25	0.00
Shank Rotation	58.72	0.00





[illegible]






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 quantitative 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




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Point of kinematic data




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- 1) Ang of Ankle at initial contact
- 2) Peak Ankle dorsal flexion 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 minimal knee flexion at middle support.
- 8) Peak of maximal 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) Peak of pelvic down in midle support.
- 14) Peak 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.







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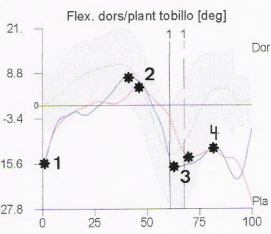
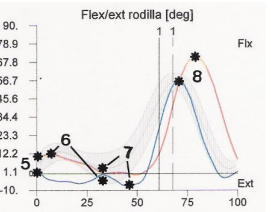


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Ankle and knee





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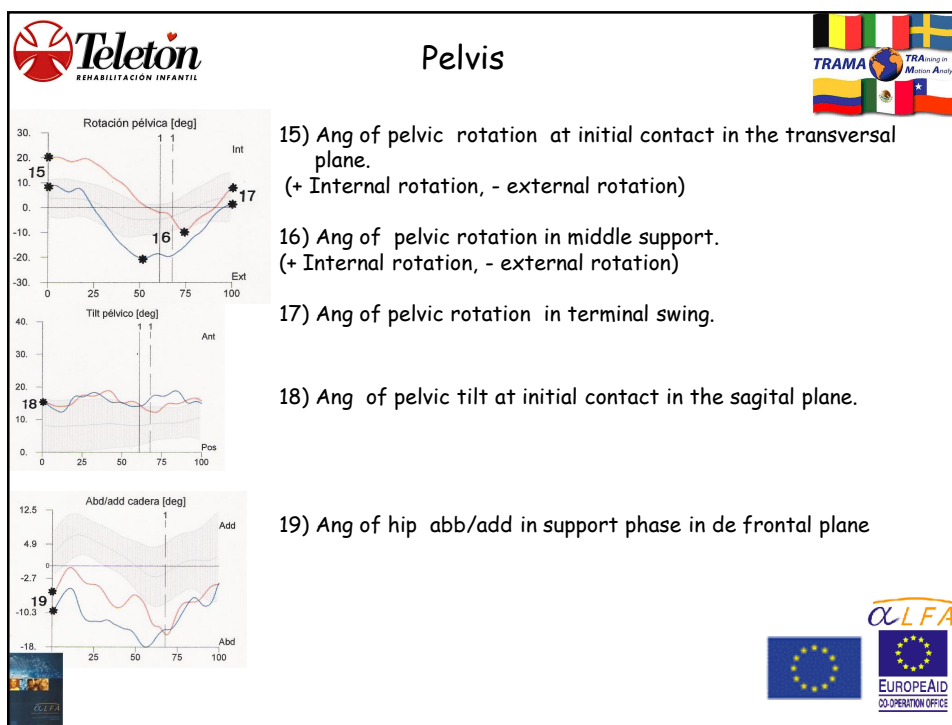
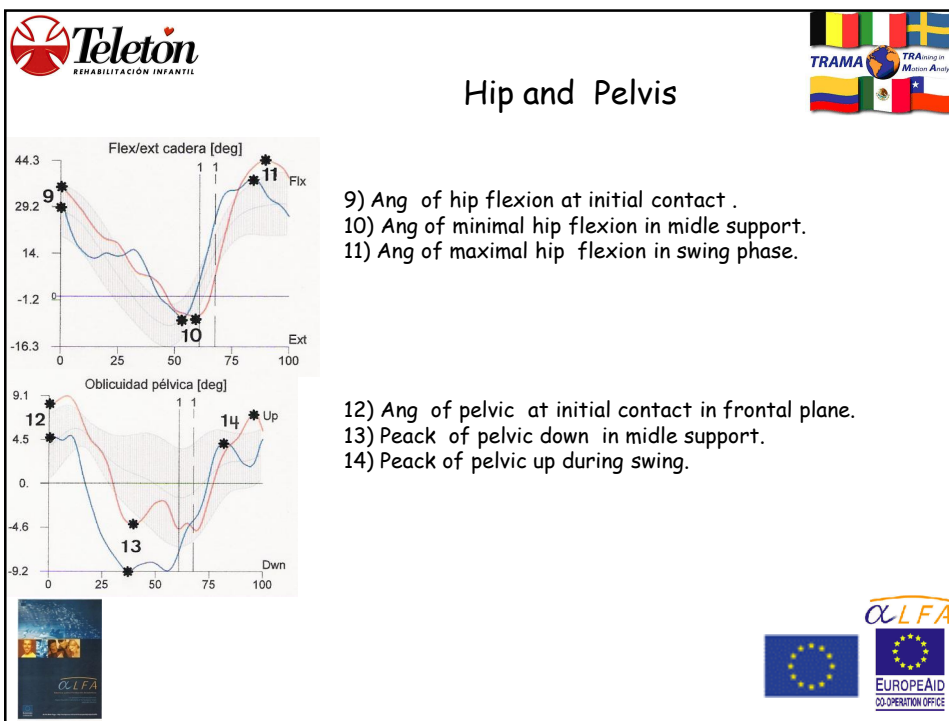



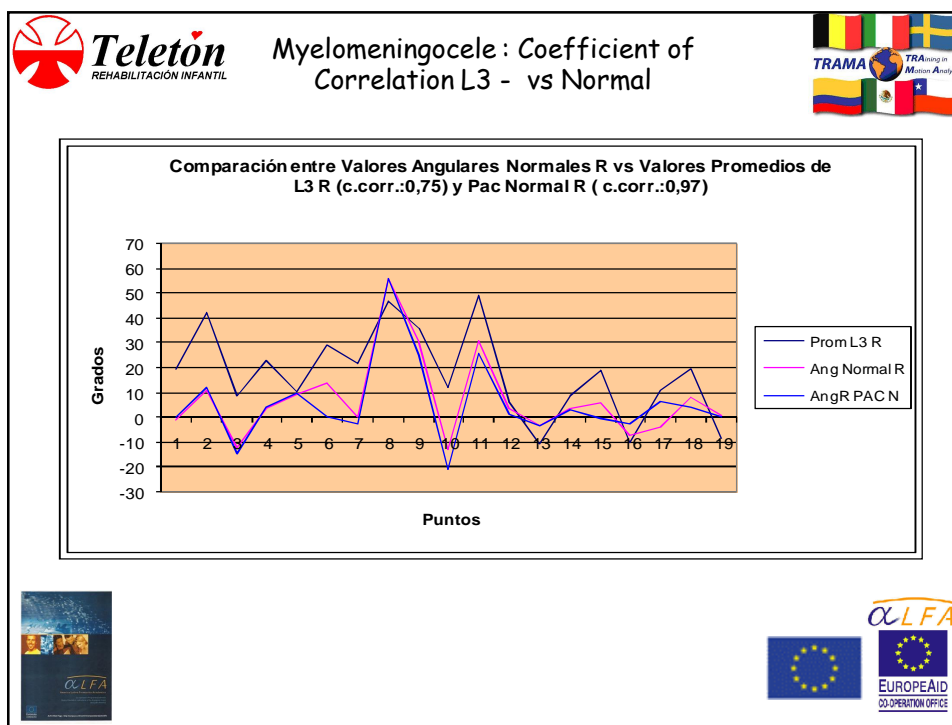
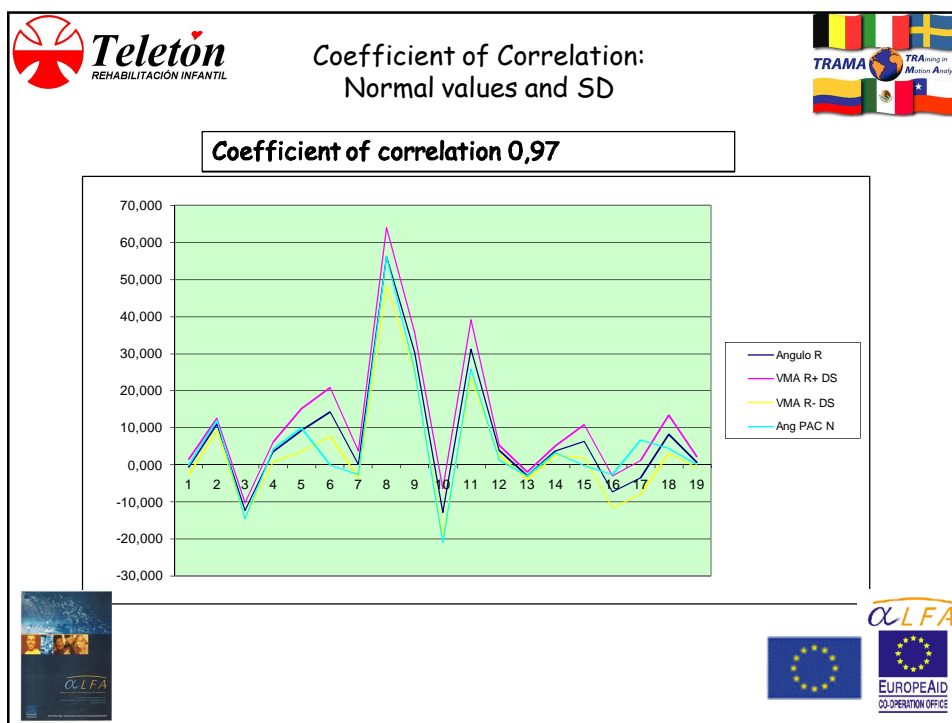
- 1) Ang of Ankle at initial contact
- 2) Peak Ankle dorsal flexion during support phase
- 3) Ang of Ankle in toe off
- 4) Ang of maximal dorsal flexion of ankle in swing phase.
- 5) Ang of Knee at initial contact .
- 6) Peak of knee at the loading response.
- 7) Ang of minimal knee flexion at middle support.
- 8) Peak of maximal knee flexion in swing phase.

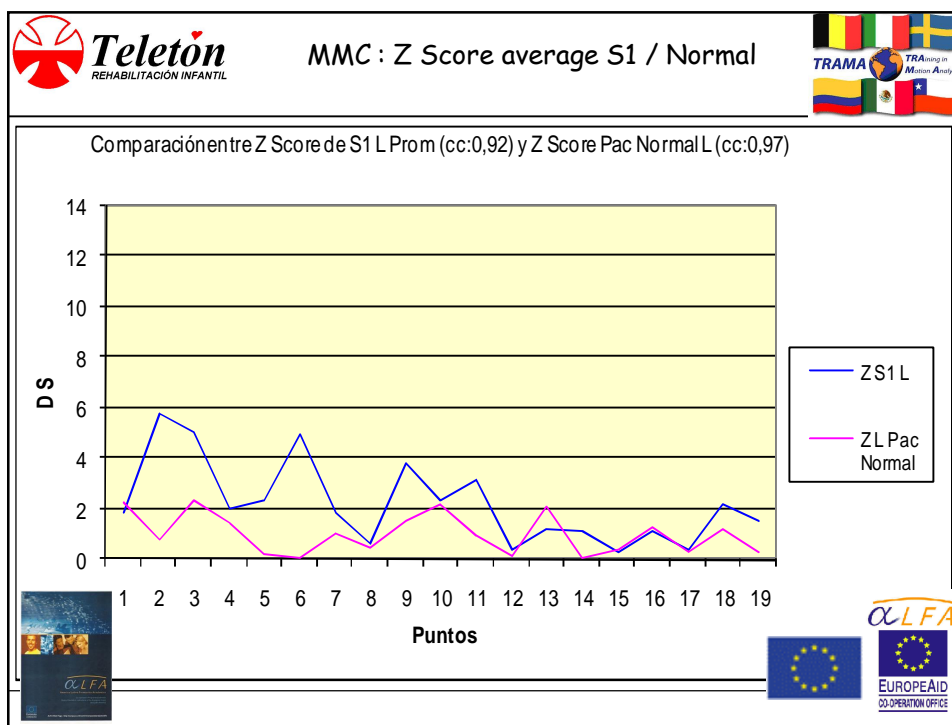
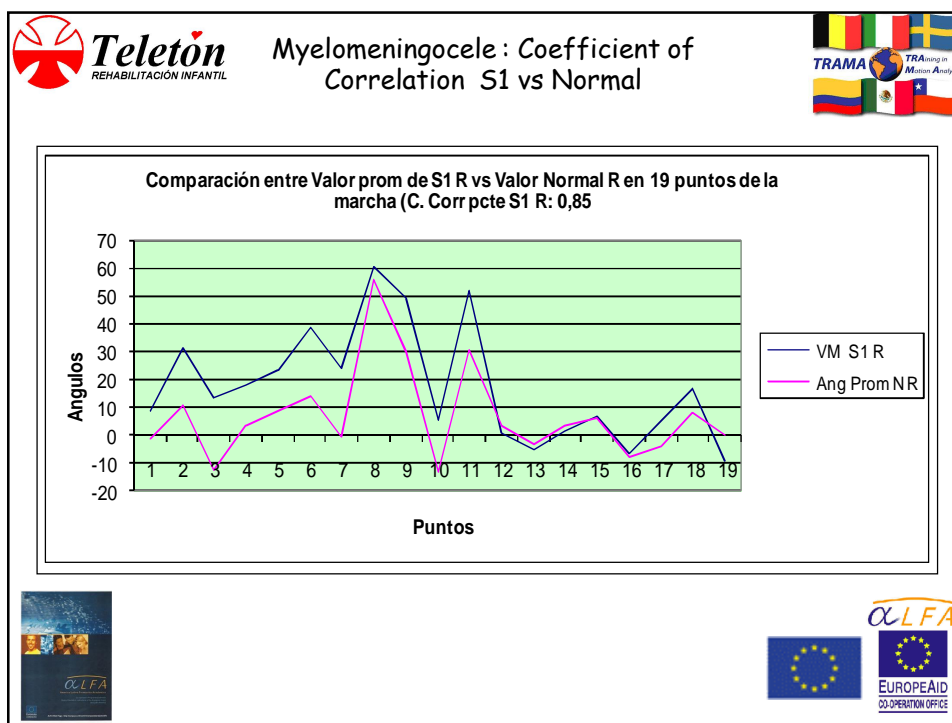






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Mielomeningocele



- “ 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 inicialmente 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 that will allow us to make an objective assesment of the gait in patients with MMC





Gracias



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Thesis




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Problem definition:
Nowadays we do not have an instrument that will allow us to make an objective assesment of the gait in patients with MMC, that will give global information about his basal behaviour.

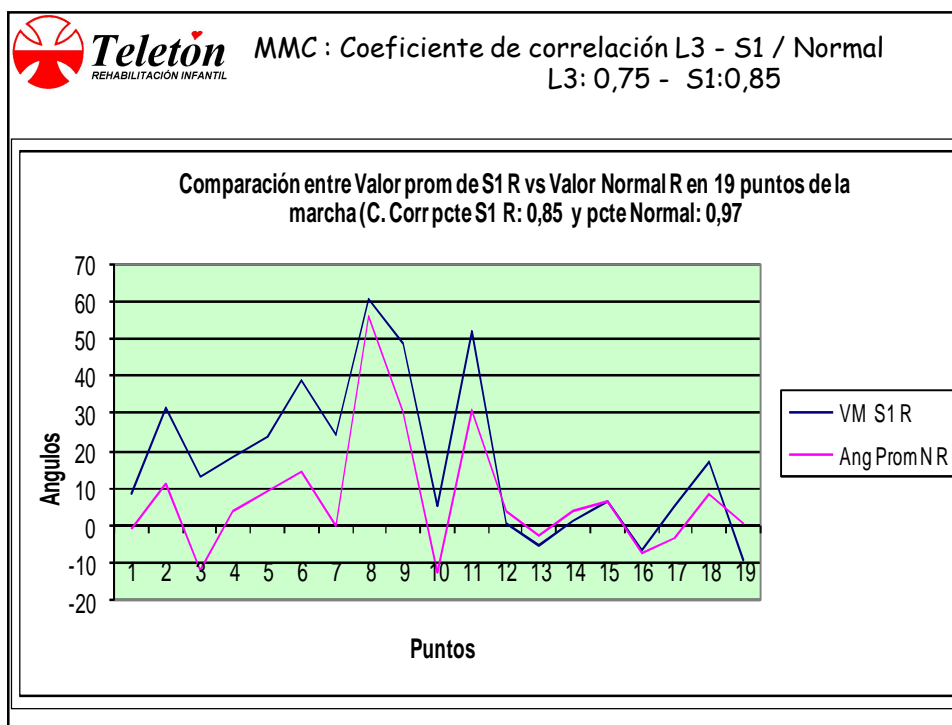
That as the IN it will allow us to establish a correlltation between the behaviour and the normal subject.


That it will allow us to precise the dispersion of the patients with diferentes levels of MMC in comparison with the normal subject.

That it will allow us to establish its response to therapy in the levels of compromise in a cuantitative way.









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Myelomeningocele


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- ❖ 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


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