



Third Course "Gait Analysis and Clinics: a focus on clinical cases"

TRAMA Project

March 10th - 14th 2008

Mariana Haro Divin. MD

Instituto de Rehabilitación Infantil TELETON





MYELOMENINGOCELE

 Description of the pathology

 Functional clinical scales

 Main treatments

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MYELOMENINGOCELE



“CONGENITAL DISORDER DUE TO A DEFECT OF NEURAL TUBE CLOSURE DURING THE NEURALATION PHASE OF EMBRYOLOGIC DEVELOPMENT”.

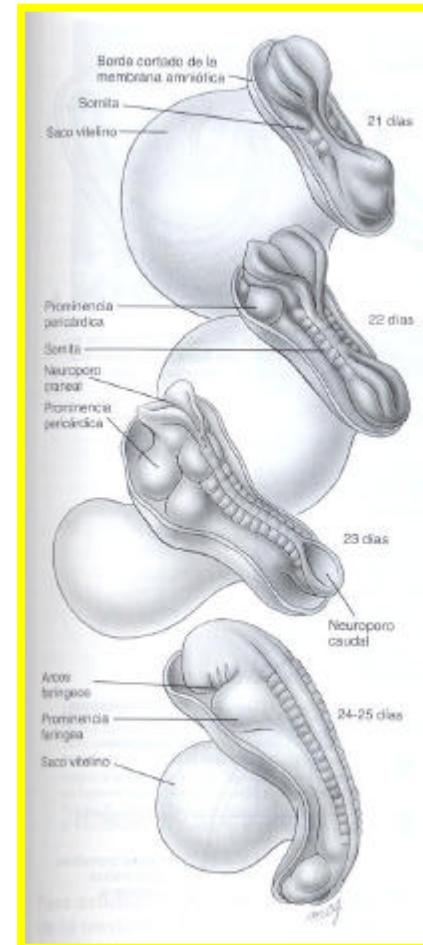
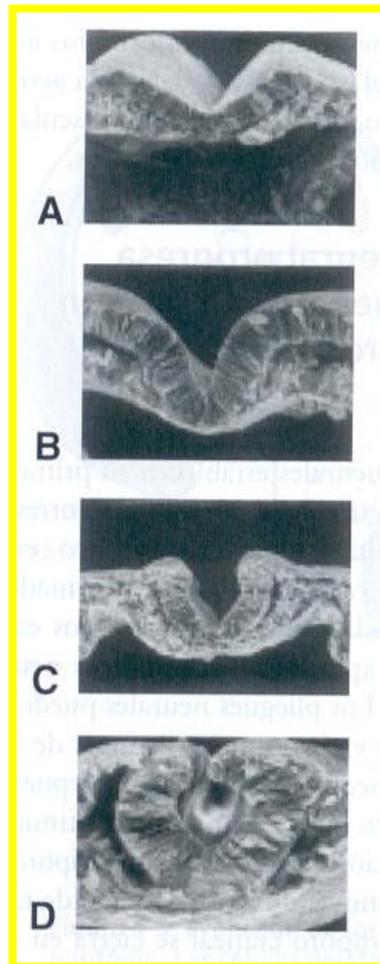
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EMBRYOLOGIC DEVELOPMENT



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MYELOMENINGOCELE



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ETIOLOGY



MULTIFACTORIAL:

 Genetic Factor

 Environmental Factors

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II.-DISEASE SYMPTOMS .



1.- PRIMARY DISORDERS:

 Paraplegia

 Sensitivity disorders

 Neurogenic bladder

 Neurogenic bowel

 Musculo skeletal disorders

 Renal disorders

 SNC malformations

 Aqueductal hydrocephaly

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II.-DISEASE SYMPTOMS.



2.-SECONDARY :

 Urinary tract infection

 Urinary Lithiasis

 Renal Insuficiency

 Faecaloma.

 Incontinency

 Musculoskeletal alterations due to muscular
unbalance.

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II.-DISEASE SYMPTOMS.



2.-SECONDARY DISORDERS:

 **Hidrocephaly obstructive**

 **Mental handicap**

 **Sensorial deficiencies**

 **Craneal nerves palsy**

 **Pressure ulcers**

 **Obesity**

 **Osteoporosis-fractures**

 **Seizures**

 **Functional upper limbs deficiency**

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III.-MANAGEMENT



1.- EARLY

A.- PRENATAL

B.- NEONATAL

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III.-MANAGEMENT



2.- LONG TERM

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III.-MANAGEMENT



NEURO SURGICAL COMPLICATIONS

-  Tethered cord
-  Syringomyelia
-  Hydromyelia
-  Valvular complications

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III.-MANAGEMENT



SKIN COMPLICATIONS

-  Pressure ulcers
-  Poor healing
-  Vascular disorders

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III.-MANAGEMENT



MUSCULOSKELETICAL COMPLICATIONS

 Due to muscular unbalance

 Congenital

 Arthrogripotyc

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III.-MANAGEMENT



MUSCULOSKELETICAL COMPLICATIONS

MORE INVOLVED JOINTS

 Hips

 Knees

 Ankle - foot

 Spine

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III.-MANAGEMENT



MUSCULO SKELETICAL COMPLICATIONS

HIPS

MOST FREQUENT PROBLEMS

 Contractures

 Subluxation

 Luxation



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III.-MANAGEMENT



MUSCULO SKELETAL COMPLICATIONS

KNEE

MOST FREQUENT PROBLEMS

 Flexion contracture

 Genu valgus

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III.-MANAGEMENT



MUSCULO SKELETAL COMPLICATIONS

FOOT

-  cavus
-  Bot foot
-  varus
-  cavovarus
-  equinus
-  adduct
-  valgus



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MUSCULO SKELETAL COMPLICATIONS

 Motor reeducation – exercises

 Manipulations

 Splints

 Orthoses

 Surgery

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Splints



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MUSCULO SKELETAL DIFFICULTIES

SPINE

COMMON DEFORMITIES

 Xiphosis

 Scoliosis

 Hyperlordosis



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MUSCULO SKELETAL COMPLICATIONS

SCOLIOSIS

 Congenital

 Neuromuscular



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SPINAL ORTHOSIS



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MUSCULO SKELETAL COMPLICATIONS

Fractures

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2.- LONG TERM

OBESITY

A very common problem favored by the low basal energetic expenditure.

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OBESITY

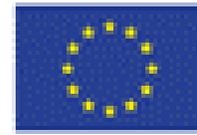
-  Early dietetic management
-  Exercises and sports.

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III.-MANAGEMENT



INTELLECTUAL ASPECTS AND PERSONAL DEVELOPMENT

 An increase in the percentage of children with low performance (mental handicap)

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III.-MANAGEMENT



INTELLECTUAL AND PERSONAL DEVELOPMENT ASPECTS

Intellectual performance deteriorated by:

-  Valvular complications and SNC infections.
-  Hypoventilation (at night)
-  Sensory problems
-  Hydrocephaly normotens (DOC)

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INTELLECTUAL ASPECTS AND PERSONAL DEVELOPMENT

 Cognitive deficits plus motor disabilities
create difficulties in achieving ADL
independence

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INTELLECTUAL ASPECTS AND PERSONAL DEVELOPMENT

-  Individual educational support
-  Regular Psychometry
-  Adequate strategies to achieve selfcare.
-  Cognitive stimulation programs

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INTELLECTUAL AND PERSONAL DEVELOPMENT ASPECTS

 Improving level of self perception and self competence for better social interaction

 Adequate family support

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III.-MANAGEMENT



ORTHOSES

- 🇪🇺 To correct and avoid deformities progression.
- 🇪🇺 Improve function
- 🇪🇺 Protection



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III.-MANAGEMENT



GAIT PROGNOSIS :

-  Motor level
-  Upper limbs function
-  Motivation - cognition
-  Balance
-  Orthopedic deformities
-  Tethered Cord
-  Obesity
-  Age
-  Proprioceptive disorders.

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MOTOR LEVEL



(IRI TELETON-2007)

 HIGH LEVEL - toracic – upper lumbar (L1-L2)

 LOW LUMBAR (L3-L4-L5)

 SACRAL LEVEL high and low (S1 a distal)

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HIGH LEVEL



Without quadriceps function



Gait with orthoses HKAFO, RGO or parapodium plus walker or crutches (therapeutic gait)



Physiological and psychological effects of bipedestation and gait.

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HIGH LEVEL



 Most stop walking in adolescence.

 Adults 99% wheel chair mobility

 Obesity is common

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HIGH LEVEL



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HKAFO ORTHOSES



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RECIPROCAL GAIT ORTHOSIS (RGO)



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STANDING FRAMES



PARAPODIUM



PARAWALKER



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STANDING FURNITURE



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STANDING FURNITURE



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LOW LUMBAR LEVEL



-  Walk with AFO and crutches
-  80% retain walking ability in adulthood
-  Quadriceps powerful
-  Gluteus med/maximus < M2 (MRC)

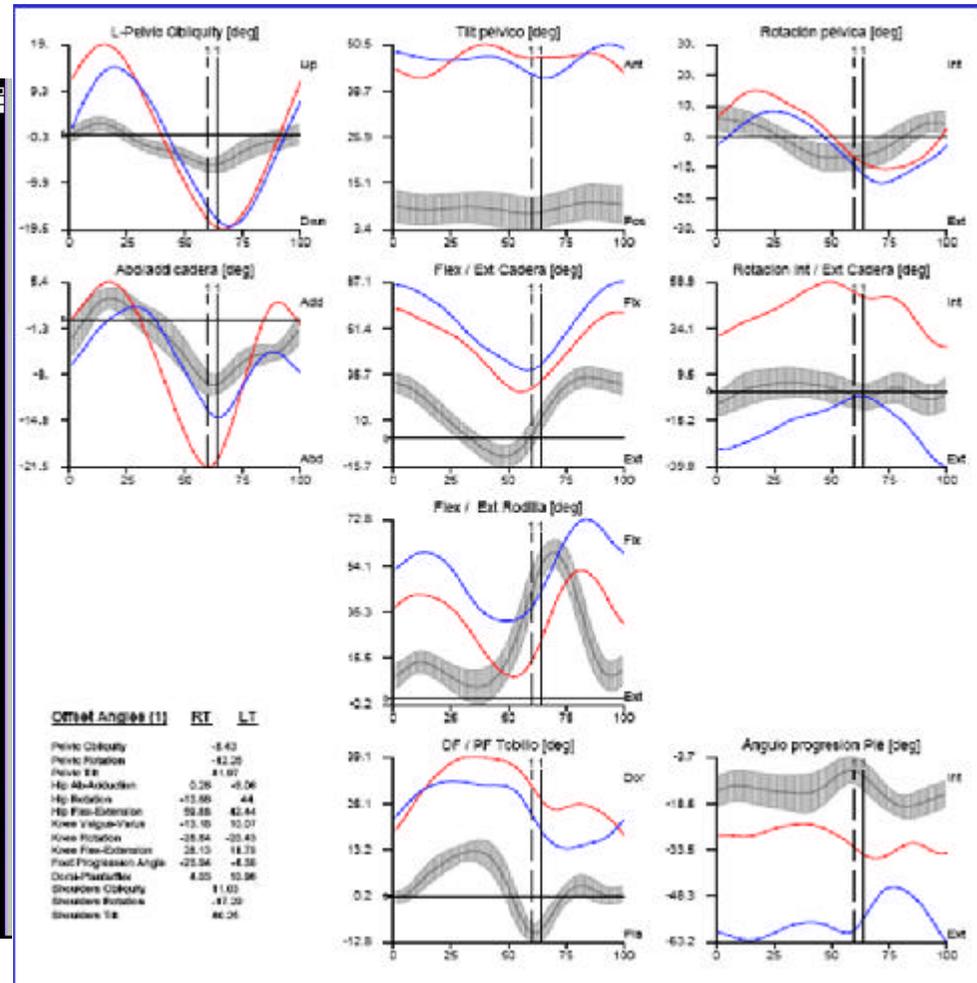
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LOW LUMBAR - L3



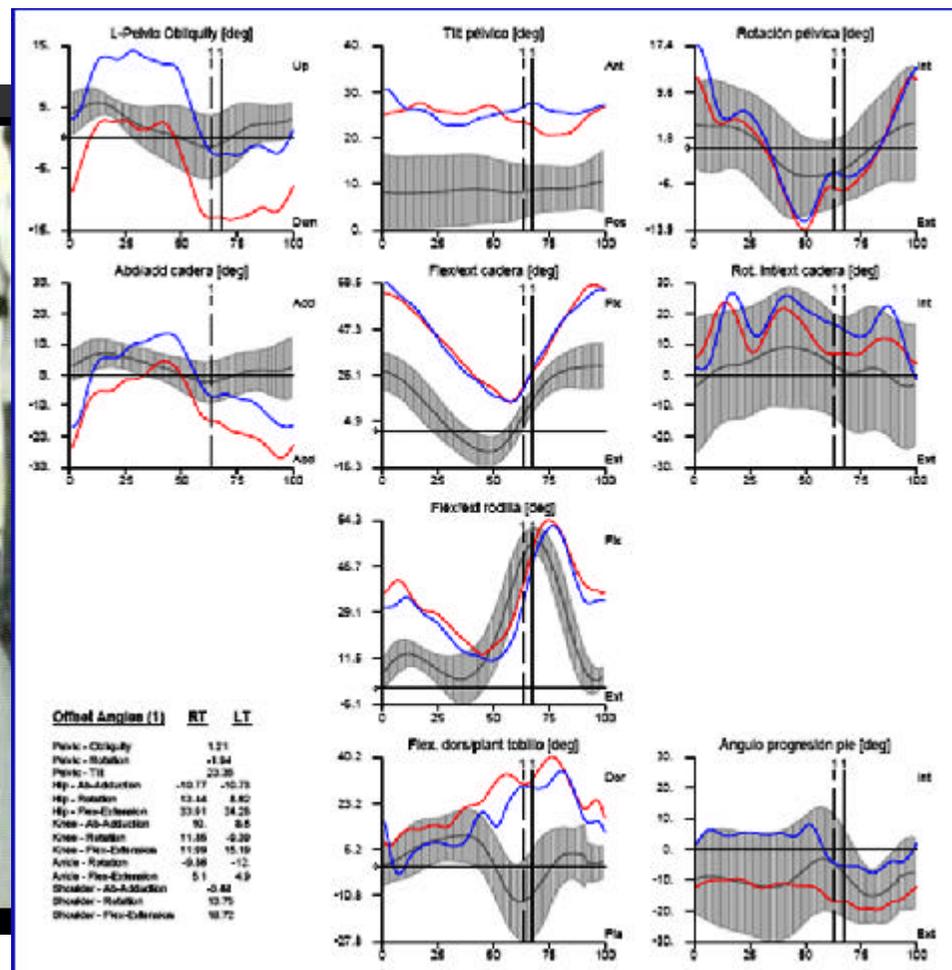
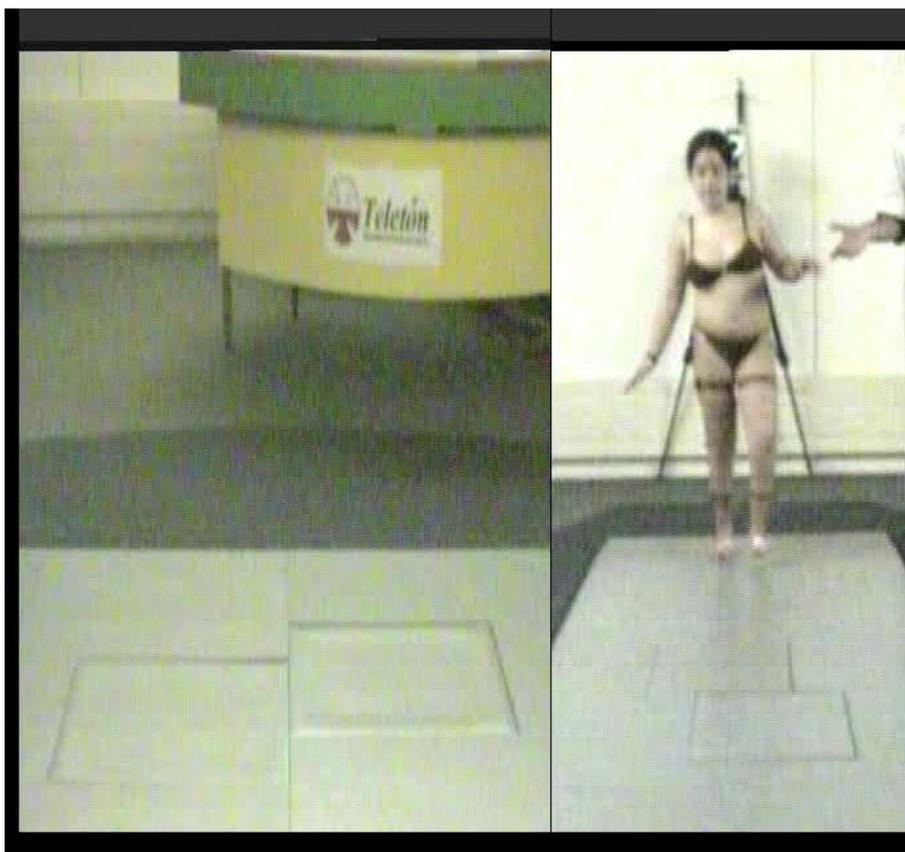
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LOW LUMBAR L4-L5



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SACRAL LEVEL



UPPER

 Weak gluteus maximum and medius (2 or > MRC)

 Gastrosoleus strength < M3

 Gait with AFOs

LOW

 Strong gluteus maximum, medius and gastro soleus

 intrinsic feet muscles compromise

 Do not need AFOs, could need SMO

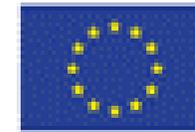
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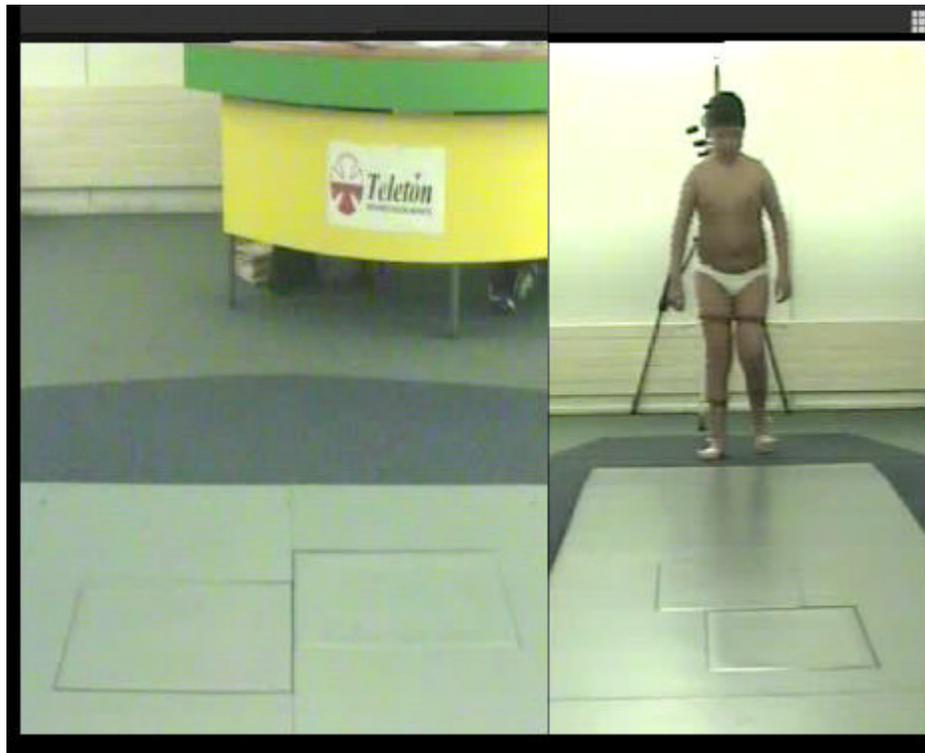


SACRAL LEVEL

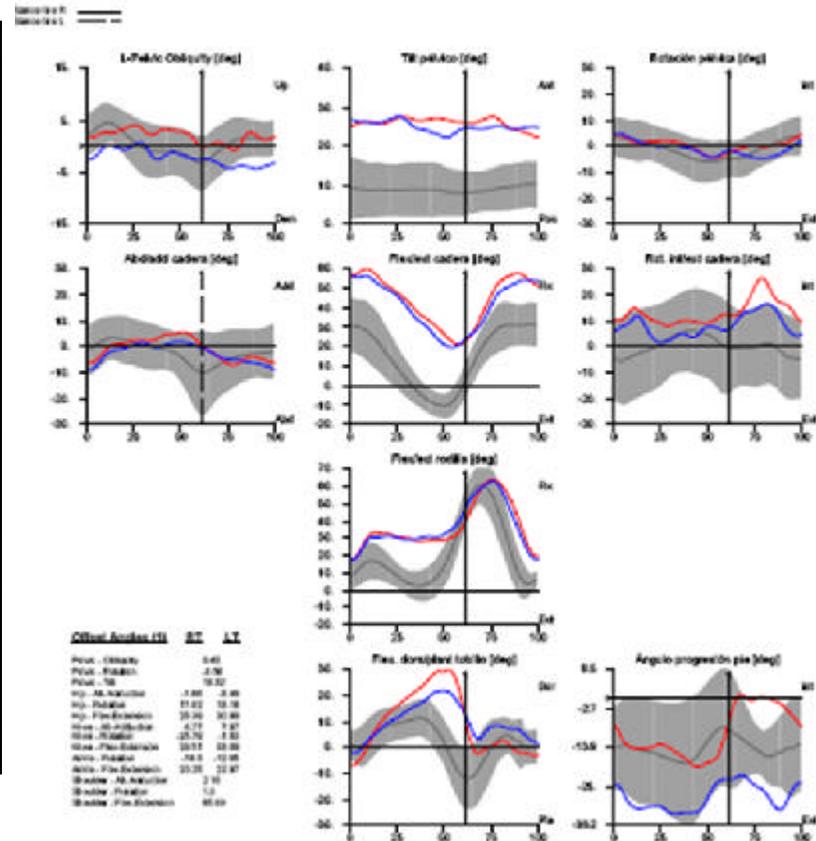


TELETON

Patient: ARAYA PABLO
Case: ONCS2005
Test: 1 - Normal walking G3
File Name: 1127a03
Protocol: Anterior



Kinemática



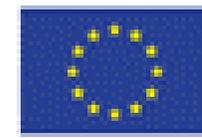
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FUNCTIONAL CLASSIFICATION OF MYELOMENINGOCELE



 IRI Teletón classification

 FMS (Functional Mobility Scale)

 Wee FIM

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FUNCTIONAL CLASSIFICATION IN MELOMENINGOCELE



Functional Mobility Scale (FMS)

GAIT DISTANCE	PUNTUACION (1 a 6)
Walk 5 mts (Ej. at home)	
walk 50 mts (Ej. School)	
Walk 500 mts (Ej. Street, shopping)	

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Functional Mobility Scale (FMS)



- 1) Use of wheel chair, car, or buggy: can stand for transfers and few steps with assistance of others or using walker.
- 2) Use walker or cart: without help from another person.
- 3) Use two canes: without help from another person.
- 4) Use cane type canadian or two hand stick: without help of another person.
- 5) Independent on flat surfaces: do not use technical aids for walking and not need help from another person. If the patient needs to use furniture, walls, fences as support, use point 4 as an appropriate description.
- 6) Independent in all kind of surfaces: do not use any kind of technical assistance, or assistance of another person to walk, run, climb or go up stairs.

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PROGRAMS ACCORDING DEVELOPMENT OF THE AGE OF THE CHILD

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UNDER ONE YEAR OLD



 Family handling and instruction of stimulation measures

 Joints hygiene

 Postural cares

 Different development stages stimulation

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UNDER ONE YEAR OLD



-  Serial casting and splinting (thermoplastics)
-  Furniture adaptations
-  Detection of sensory deficits
-  Detection of hip pathology
-  Urological control

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BETWEEN THE FIRST AND SECOND YEAR OF LIFE



-  Stimulate social - cognitive development
-  Prevention and management of deformities
-  Start bipedestation with orthoses in adapted furniture.
-  Upper extremities strengthening
-  Self care autonomy according age.
-  X Rays according evolution.

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BETWEEN 2 TO 4 YEARS OLD



 Reinforcing the above

 School Orientation

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BETWEEN 5 TO 8 YEARS



-  Must achieve independent mobility
-  Emphasis on school guidance.
-  Encourage development of social abilities and thinking
-  Reinforce specific objectives
-  Selfcare

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BETWEEN 9 AND 15 YEARS OLD

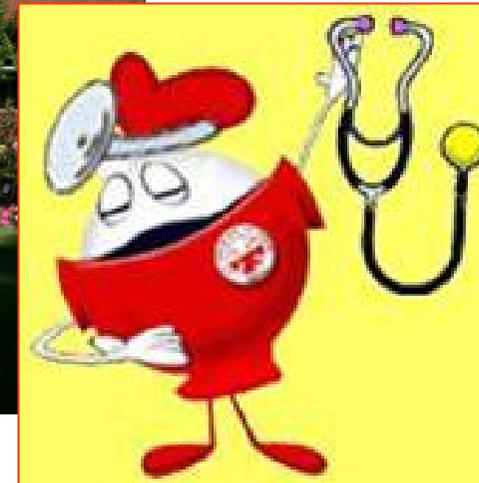


-  Growing and development changes follow up
-  Avoid gait loss *
-  Reinforce independence in mobility
-  Vocational guidance
-  **Follow up** (periodic psychometry, school performance, armonic social development).

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