THE ROLE OF THE PHYSICAL THERAPIST FOR CHILDREN WITH DEVELOPMENTAL DISORDERS

Jennifer Pitassi, PT, PCS
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OBJECTIVES

- Describe the range of services provided by Physical Therapists for children with developmental disorders

- Discuss the role of the Physical Therapist on interdisciplinary teams treating children with developmental disabilities
SCOPE OF PRACTICE

- Acute Care
  - ICU’s
  - Cardiac
  - Trauma/Orthopedic

- Outpatient
  - Long term
  - Ongoing treatment

- Interdisciplinary Clinics*

- Early Intervention
  - Usually home based
  - Babynet/First Steps system for SC

- School Based

- Rehabilitation
  - Life changing event
  - Post surgical
5 ELEMENTS TO PATIENT/CLIENT MANAGEMENT

- Guide to Physical Therapy Practice- APTA 2003 (revised)
  - Examination
    - History
    - Systems Review
    - Test and Measure
  - Evaluation
    - Make clinical judgments based upon data
    - Reflects the chronicity/severity of current problem
  - Diagnosis
    - Label
    - Identify the impact of the impairment
  - Prognosis
    - Predicted optimal level of improvement
    - Develop the plan of care
  - Intervention
    - Treatment
Examination
- Birth History critical!
- Progression of tone
- Ashworth/Modified Ashworth Scale
- Presence of Dystonia
- ROM
  - Tardieu scale: R1/R2
  - Contractures
  - Orthopedics anomalies
- Functional Assessment
  - Movement and functional mobility
  - Orthoses/Splinting - UE and LE
  - Durable Medical Equipment – Standers, Wheelchairs
### Ashworth Scale

<table>
<thead>
<tr>
<th>Ashworth Score</th>
<th>Degree of Muscle Tone</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No increase in tone</td>
</tr>
<tr>
<td>2</td>
<td>Slight increase in tone resulting in a &quot;catch&quot; when affected limb is moved in flexion and extension</td>
</tr>
<tr>
<td>3</td>
<td>More marked increase in tone; passive movement difficult</td>
</tr>
<tr>
<td>4</td>
<td>Considerable increase in tone; passive movement difficult</td>
</tr>
<tr>
<td>5</td>
<td>Affected part rigid in flexion and extension</td>
</tr>
</tbody>
</table>

### Modified Ashworth Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No increase in muscle tone</td>
</tr>
<tr>
<td>1</td>
<td>Slight increase in muscle tone, manifested by a catch or by minimal resistance at the end of the range of motion (ROM) when the affected part(s) is moved in flexion or extension</td>
</tr>
<tr>
<td>1+</td>
<td>Slight increase in muscle tone, manifested by a catch, followed by minimal resistance throughout the remainder (less than half) of the ROM</td>
</tr>
<tr>
<td>2</td>
<td>More marked increase in muscle tone through most of the ROM, but affected part(s) easily moved</td>
</tr>
<tr>
<td>3</td>
<td>Considerable increase in muscle tone, passive movement difficult</td>
</tr>
<tr>
<td>4</td>
<td>Affected part(s) rigid in flexion or extension</td>
</tr>
<tr>
<td>9</td>
<td>Unable to test</td>
</tr>
</tbody>
</table>
Gross Motor Functional Classification System

Gross Motor Function Measure

- 88 items
  - 66 items for modified shorter version
- Criterion-referenced test
- 5 domains
  - Lying & rolling
  - Sitting
  - Crawling & Kneeling
  - Standing
  - Walking, Running, Jumping

Predictability of Function

Referrals
- PT: splinting, serial casting, developmental training, seating evaluation
- OT: splinting, feeding, ADL’s
- ST: Augmentative Communication
- Orthotist: AFO’s, SMO’s
  - Growth issues
  - Not fitting properly
- Orthopedics
  - Address scoliosis, dislocated hips, torsion issues, contractures

Recommendations for Interventions
- Oral meds- baclofen, Sinemet, Artane
- Botox injections- which muscles and dosing
- Intrathecal Baclofen Pumps
- Selective Dorsal Rhizotomy
- Conservative Management
Examination

- Birth History - In-utero closure vs post-natally
- Shunt?
- Tests and Measures - MMT is critical

Orthopedic
- Scoliosis
- Club feet
- Tibial rotation
- Dislocation of hips

Asymmetries

Tethered cord symptoms
- Change in bowel/bladder
- Rapidly progressing scoliosis
- Clonus that was not present prior
Evaluation

International Myelodysplasia Study Group (IMSG) criteria for assigning motor levels based on manual muscle testing has been shown to best reflect the innervation patterns of people with myelodysplasia

- T10 and above
- T12:
  - L2: Hip flexors, adductors, rotators 3/5
  - L3: L2 above + knee extension 3/5
  - L4: L3 above + Ant. Tib. OR medial hamstring 3/5 at least

- L5: L4 above + lateral hamstring 3/5 + Grade 2 gluteus medius (L4 to S1) OR Grade 3 tibialis posterior (L5-S1) OR Grade 4 peroneus tertius (L4-S1)

- S1: L5 above + 2 of following Grade 2 gluteus medius (L4 to S1) OR Grade 3 tibialis posterior (L5-S1) OR Grade 4 peroneus tertius (L4-S1)

- S2: S1 above +PF 3/5 or higher and with gluteus medius and maximus strength 4/5 or better

- S3: All lower limb muscle groups 5/5 with the exception of one or two muscles 4/5; considered typical except can not assess bowel/bladder due to age

- No loss Lesion: 5/5 throughout, no bowel/bladder involvement
IN UTERO REPAIR


- Reduced likelihood of need for a shunt
  - 67.9 % required in-utero repair (MOM’s)
  - 97.5 % required post natal repair

- Ability to walk without orthosis/crutches
  - Dependent upon level
  - 41.9% in utero repair group
  - 20.9% post natal repair

- Prematurity rates
  - Average of 34.1 weeks for in utero repair (28% had RDS)
  - Average of 37.3 weeks in post natal repair (6% had RDS)

- Hindbrain herniation – Chiari malformations
  - Present in all infants in study (in utero and post natal repair)
  - At 12 months of age, 35.7% who had in utero repair no longer evident, 6.3 % who had post natal repair no longer evident

- 1/3 of all Mothers in utero repair group had some degree of uterine lining thinning (increase of rupture)
  - **** recommendations for C section for delivery and all subsequent deliveries
Diagnosis
- Are they performing function based upon level of innervation
- Orthopedic involvement

Prognosis
- Changes in function/due to access in social and community requirements

Intervention/Treatment
- Referrals for seating/DME (ie walkers, crutches, etc.)
- Referrals for orthotist
- UE function for wc users
- Balance
- Transfer from all levels
- Ambulation/Standing


Rehabilitation Engineering & Assistive Technology Society of North America
Examination
- Genetic
  - Trisomy 21
  - Mosaicism
  - Translocation
  - Other/Mixed
- Gross Motor Function Measure or PDMS-2
- Other system involvement
  - Cardiac, GI, hearing/vision

Evaluation
- Compensatory Patterns
  - “w” sitting
  - Wide base of support
  - Hyperextension
  - Pronation at feet

Diagnosis

** Basically takes double the time to complete the motor skill

DOWN SYNDROME: PROGNOSIS

mild motor impairment

moderate/severe motor impairment
INTRODUCTION/TREATMENT

- Referrals to PT/OT/ST
- Early Intervention is critical
- Strengthening
  - Core/Trunk
- Mid range control
- Orthotics
  - Supramalleolar Orthotics - SureStep
- Durable Medical Equipment
  - Standers
  - Corner Seats
  - Spio Vests
Examination
- History is critical: birth weight, gestational age, hospital course
- MRI or Head ultrasound
- Tone?
- Asymmetries
  - Extremities
  - Neck/Torticollis
    - Plagiocephaly
- Alberta Infant Motor Scale
- Observation of movement!

Evaluation
- Are they performing between corrected and Chronological ages?
- Abnormal movement patterns/Compensatory patterns
- Asymmetries

Diagnosis
HIGH RISK/NICU GRADUATE CLINIC: PROGNOSIS

- Alberta Infant Motor Scale
  - 10th% at 4 months and the * 5th% at 8 months


(1) Determined best cut-off scores on the AIMS for predictive purposes, and (2) to compare the predictive abilities of the AIMS with those of the Movement Assessment of Infants (MAI) and the Peabody Developmental Gross Motor Scale (PDMS).
**HIGH RISK/NNICU GRADUATE CLINIC: INTERVENTION**

- **Intervention/treatment**
  - Referrals to orthopedics, Spasticity clinic
  - Referrals to PT/OT/ST or Early Intervention

- Developmental handling
- Core/Trunk Strengthening
- Orthotics
- Adaptive equipment
- Home Program
  - ROM/stretching
  - Handling
http://www.youtube.com/watch?v=Ze5CvbXm_nogait_analysis_21_months_old–YouTube
QUESTIONS