Measurement Tools for Occupational Therapists and Physiotherapists Working with School-Aged Children

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Learning Objectives:

- Describe how to determine which measurement instruments are the best match
    - Describe validity and how validity is determined
    - Describe reliability and ways to improve reliability
- Describe broad categories of measurement tools based on the International Classification of Functioning, Disability and Health (ICF)
- Locate resources of appraised reviews of relevant measurement instruments
- Identify 2-3 new measurement tools to further explore

Measurement Terminology

Why do we need to measure?

- To inform treatment plans and areas in which to intervene
- To help identify optimum techniques for the best clinical outcomes
    - Help demonstrate treatment effects
    - Useful in comparing different interventions
- To show children, families and schools benefits of therapy
- To encourage reflective practice: "Has my intervention worked?"
- To demonstrate outcomes for potential funding
- To promote a common language

Validation Process:

What is the purpose of my measurement?

- To discriminate
- To predict
- To evaluate *
- To plan

Who is the child?

- Age
- Suspected or known diagnosis
- Presenting challenges

What is the *construct* or *issue* you are measuring?

- Meaningful
- Valuable to client

Validation Process:

- Step by step
- Ongoing
- Different types of validation evidence

Appraisal process for valid use of an instrument:

Older approaches:

- Face Validity
- Content
- Construct
- Criterion

Contemporary approaches

- Evidence based on test content
- Evidence based on response processes
- Evidence based on internal structure
- Evidence based on relations to other variables
- Consequences

Bottom Line:

- Degree of confidence in interpreting results is dictated by your interpretation of the how closely your population, practice setting and purpose match the sample.
- How to convey or document this?

Reliability

Forms of reliability

- Inter rater reliability
- Internal consistency
- Test-retest Reliability
- Intra-rater Reliability

A basic review of statistical terms:

See: www.rehabmeasures.org/rehabweb/rhstats.aspx

Constraints that can affect measurement:

- Environment/Materials
- Staff
- Time

Strategies to Optimize Reliability:

- Restriction
- Training and standardization
- Averaging repeated measures

Bottom Line:

- Your degree of confidence in interpreting results is dictated by how reliable the measure is for your population and purpose
- How to convey or document this?

Summary:

Validity: "Measures what it is intended to measure"
Reliability: "Measures same information over different situations"
Bottom Line: Together this affects your degree of confidence in interpreting results

Clinician Rated vs Patient Reported

Clinician Rated

- Examples –?

Patient Reported

- Examples - ?

Bottom Line:

- There are benefits of incorporating both clinician-rated and patient-reported instruments to measure overall performance

Measures:

Reviewed in the following 4 categories:

- Body Function and Structure
- Activity
- Participation
- Quality of Life

(* Evaluative measure/measure change over time)

Body Structure and Function Measures

Spinal Alignment and Range of Motion Measure (SAROMM)

Area of Assessment:

- Posture and flexibility

Diagnosis/Age: Includes children with CP
How to access: (free download)
http://www.canchild.ca/en/measures/saromm.asp

Selective Control Assessment of the Lower Extremity (SCALE)

Area of Assessment:

- Voluntary selective motor control of lower limb joints (hip, knee, ankle).

Diagnosis/Age: Children with CP aged 4 to 18 years
How to access: (free download)
http://www.uclaccp.org/images/ResearchPapers/SCALE%20reliability%20and%20validity_DMCN%20Aug2009.pd

The Chronic Pain Assessment Toolbox for Children with Disabilities

Area of Assessment:

- Chronic pain in pediatric disability clinical practice – 8 pain measures are included

Diagnosis/Age: Measures cover various populations of children and adolescents including: CP, MD, RA, SB
How to access: (free download)
http://hollandbloorview.ca/TeachingLearning/EvidencetoCare/PainToolbox

Activity Measures

*Assisting Hand Assessment (AHA)**

Area of Assessment:

- Hand function: Measures and describes how children with a unilateral upper limb disability use their affected hand (assisting hand) collaboratively with the non-affected hand in bimanual play.

Diagnosis/Age: Children with a unilateral disability (hemiplegia or obstetric brachial plexus palsy) 18 months - 12 years

How to access: ($)

http://www.ahanetwork.se/aha.php (includes psychometric properties)

*Quality of Upper Extremity Skills Test (QUEST)**

Area of Assessment:

- Quality of upper extremity function in four domains: dissociated movement, grasp, protective extension, and weight bearing.

Diagnosis/Age: Children with CP aged 18 months - 8 years

How to access: ($)

https://www.canchild.ca/en/measures/quest.asp

*The Melbourne Assessment 2 (MA2)**

Area of Assessment:

- Unilateral upper limb function and quality of upper limb movement

Diagnosis/Age: Children with neurological conditions aged 2.5 - 15 years

How to access: ($)

http://www.rch.org.au/melbourneassessment/ (includes a long reference section with +++ evaluative validity evidence)

School Version of the AMPS (School AMPS)

Area of Assessment:

- Student's ***quality*** of schoolwork task performance (e.g., cutting, pasting, writing, drawing, computing)

Diagnosis/Age: Students 3 - 15 years experiencing challenges with schoolwork task performance

How to access: ($): http://www.innovativeotsolutions.com/content/school-amps/

*http://www.innovativeotsolutions.com/content/wp-content/uploads/2014/01/SchoolAMPSReportSupplement.pdf – see page 2

*Gross Motor Function Measure (GMFM)**

Area of Assessment:

- Evaluate change in gross motor function
- Two versions: original 88-item measure (GMFM-88) and more recent 66-item GMFM (GMFM-66)

Diagnosis/Age:

- GMFM-66 version is ONLY valid for use with children with CP (5 m - 16 years)
- GMFM-88 version also valid for use with children with Down Syndrome

How to access: ($ for manual but score sheets are free)

http://motorgrowth.canchild.ca/en/gmfm/overview.asp

Quality FM (GMPM)*

Area of Assessment:

- Quality of movement related to ambulatory skills
- To evaluate change over time in specific qualitative features, or attributes, of gross motor behaviour

Diagnosis/Age: It is a new version of the GMPM that is specifically designed for use with children with CP, ages 4 and up, who are in GMFCS Levels I, II and III

How to access: ($)

http://motorgrowth.canchild.ca/en/GMPMQualityFM/qualityfm.asp?_mid_=2531

Handwriting Assessments ($)

- The McMaster Handwriting Assessment Protocol - 2nd edition (Pollock et al., 2009)
- Minnesota Handwriting Assessment (MHA) (Reisman, 1999)
- Evaluation Tool of Children's Handwriting (ETCH) (Amundson, 1995)
- Children's Handwriting Evaluation Scale (CHES) (Phelps & Stempel,1982, 1985)
- Print Tool (Olsen, 2006)
- Scale of Children's Readiness for PrinTing (SCRIPT) (Weil & Amundson, 1994)
- Test of Handwriting Skills-Revised (Milone, 2007)

Activity and/or Participation Measures

Pediatric Evaluation of Disability Inventory – Computer Adaptive Test (PEDI-CAT) *

Area of Assessment:

- Abilities in the **three functional domains** of Daily Activities, Mobility and Social/Cognitive plus a **Responsibility domain**

Diagnosis/Age: Children and youth (birth through 20 years of age) with a variety of physical and/or behavioral conditions

How to access: ($): http://pedicat.com/category/home/

PEDI - Domains

- **Daily Activities:** Getting Dressed, Keeping Clean, Home Tasks, and Eating & Mealtime
- **Mobility:** Basic Movement & Transfers, Standing & Walking, Steps & Inclines, Running & Playing and Wheelchair
- **Social/Cognitive:** Interaction, Communication, Everyday Cognition, and Self-Management
- **Responsibility:** Organization & Planning, Taking Care of Daily Needs, Health Management, and Staying Safe

Canadian Occupational Performance Measure (COPM)*

Area of Assessment:

- Assesses an individual's perceived occupational performance in the areas of self-care, productivity, and leisure.

Diagnosis/Age:

- Designed for use with all clients regardless of diagnosis (Law et al, 2004)
- Validated with clients including : CP, Traumatic BI and Pediatrics

How to access: ($): http://www.thecopm.ca/

Goal Attainment Scale (GAS) *

Area of Assessment:

- Client's occupational goal(s) achievement

Diagnosis/Age: Children with developmental, physical, and communication needs (McDougall & King , 2007)

How to access: (free download)

http://canchild.ca/elearning/dcd_pt_workshop/assets/planning-interventions-goals/goal-attainment-scaling.pdf

Scoring

-2 = Much less than expected (Worst clinically plausible condition)
-1 = Somewhat less than expected
0 = Expected level
+1 = Somewhat better than expected
+2 = Much better than expected

Perceived Efficacy and Goal Setting (PEGS)

Area of Assessment:

- A measure that uses children's self-reported performance on everyday tasks to establish and prioritize occupational therapy interventions.

Diagnosis/Age: For children who are chronologically or developmentally at a 6 – 9 year-old level. It can be used with children of all type of disabilities and severity, as long as they can formulate a response

How to Access: ($)

http://participation-environment.canchild.ca/en/perceived_efficacy_goal_setting_pegs.asp

The WeeFIM II® System*

Area of Assessment:

- Functional performance in three domains: self-care, mobility, and cognition

Diagnosis/Age: Children and adolescents with acquired or congenital disease

How to access: ($$$$): http://www.udsmr.org/WebModules/WeeFIM/Wee_About.aspx

School Function Assessment (SFA)

Area of Assessment:

- Three parts:
  - Participation in school-related activities
  - Task supports
  - Activity performance of specific school-related functional activities

Diagnosis/Age: Used for elementary students (K-6) with disabilities

How to Access: ($): www.peasronassessments.com

*http://images.pearsonclinical.com/images/assets/SFA/SFAOverview.pdf

Participation Measures

Children's Assessment of Participation and Enjoyment (CAPE) and Preferences for Activities of Children (PAC)

Area of Assessment:

The CAPE and the PAC (CAPE/PAC) are two companion measures of children's participation. Both are self-report measures of children's participation in recreation and leisure activities outside of mandated school activities.

Diagnosis/Age:

Both measures are appropriate for children and youth, with and without disabilities, ages 6 and 21.

How to access: ($)

http://www.pearsonassess.ca/en/programs/00/62/97/p006297.html

The Participation and Environment Measure for Children and Youth (PEM-CY)

Area of Assessment:

- *Parent-report* measure that asks about participation in the home, school and community, along with environmental factors within each of these settings.

Diagnosis/Age: Children and youth, with and without disabilities, ages 5 - 17.

How to access: ($)

http://participation-environment.canchild.ca/en/participation_environment_measure_children_youth.asp

The Child and Adolescent Scale of Participation (CASP)

Area of Assessment:

- Measures the extent to which children participate in home, **school**, and community activities as reported by family caregivers.

Diagnosis/Age: For children with traumatic and other acquired brain injuries (ABI). A youth report version is also available.

How to Access: (free download) http://sites.tufts.edu/garybedell/measurement-tools/

Child Occupational Self Assessment (COSA)

Area of Assessment:

- Children's and youth's perceptions regarding their own sense of occupational competence and the importance of everyday activities

Diagnosis/Age: Children and youth's with disabilities

How to Access: ($): http://www.cade.uic.edu/moho/productDetails.aspx?aid=3

Quality of Life Measures

Caregiver Priorities and Child Health Index of Life with Disabilities (CPCHILD)

Areas of Assessment:

- Caregivers perceptions of their child's health status and well-being

Diagnosis/Age: Children aged 5-12y with severe CP

How to Access: (free download):

http://www.sickkids.ca/pdfs/Research/CPChild/6573-CPCHILD_manual.pdf

The Cerebral Palsy Quality of Life Questionnaires (CP QOL-Child & Teen)

Areas of Assessment:

- Quality of Life (QOL)

Diagnosis/Age: Children with cerebral palsy aged 4-12 years & adolescents aged 13-18 years

How to Access: (free download)

http://www.cpqol.org.au/questionnaires_manuals.html

Neuro QOL

Areas of Assessment:

- Health-related quality of life

Diagnosis/Age: Children with neurological disorders:

  - Epilepsy
  - Muscular Dystrophies

How to Access: (free download):http://www.neuroqol.org/Pages/default.aspx

Summary

Reviewed:

- 20 + measurement instruments
- 4 broad categories:
  - Body Function and Structure
  - Activity
  - Participation
  - Quality of Life

Classification Systems (CP)

- Gross Motor Function Classification System (GMFCS)
- Manual Ability Classification System (MACS)
- Eating and Drinking Ability Classification System (EDACS)
- Communication Function Classification System (CFCS)

Resources (links):

Can be downloaded for free at:

- GMFCS: http://motorgrowth.canchild.ca/en/gmfcs/resources/gmfcs-er.pdf
- MACS: www.macs.nu
- EDACS: http://www.sussexcommunity.nhs.uk/get-involved/eating_drinking_classification.htm
- CFCS: http://cfcs.us

Gross Motor Function Classification System (GMFCS)

- 5 level classification system
- Describes gross motor function
  - self-initiated movement (emphasis on sitting, walking, and wheeled mobility)
- Children and youth with CP

GMFCS - Original Version (1997):
http://www.canchild.ca/en/measures/gmfcs_original.asp
GMFCS - Expanded and Revised Version (2007):
http://www.canchild.ca/en/measures/gmfcs_expanded_revised.asp

GMFCS – E & R -Gross Motor Function Classification System

LEVEL I - Walks without Limitations
LEVEL II - Walks with Limitations
LEVEL III - Walks Using a Hand-Held Mobility Device
LEVEL IV - Self-Mobility with Limitations; May Use Powered Mobility
LEVEL V - Transported in a Manual Wheelchair

Manual Ability Classification System for Children with Cerebral Palsy 4-18 years (MACS)

I. Handles objects easily and successfully.
II. Handles most objects but with somewhat reduced quality and/or speed of achievement.
III. Handles objects with difficulty; needs help to prepare and/or modify activities.
IV. Handles a limited selection of easily managed objects in adapted situations
V. Does not handle objects and has severely limited ability to perform even simple actions.

EDACS

Level I	Eats and drinks safely and efficiently.
Level II	Eats and drinks safely but with some limitations to efficiency.
Level III	Eats and drinks with some limitations to safety; there may be limitations to efficiency.
Level IV	Eats and drinks with significant limitations to safety.
Level V	Unable to eat or drink safely – tube feeding may be considered to provide nutrition.

Communication Function Classification System (CFCS) for Individuals with Cerebral Palsy

Level I - Effective Sender and Receiver with unfamiliar and familiar partners.
Level II - Effective but slower paced Sender and/or Receiver with unfamiliar and/or familiar partners.
Level III - Effective Sender and Receiver with familiar partners.
Level IV - Inconsistent Sender and/or Receiver with familiar partners.
Level V - Seldom Effective Sender and Receiver even with familiar partners.

Pulling it all together – see next page

Key Messages

- Simple clinical classification systems are available to describe gross motor, manual ability, eating and communication function of young people with cerebral palsy.
- These systems are complementary to traditional biomedical descriptions of disorders and disabilities.
- The systems are free, easily accessible, usable by, and acceptable to parents and school staff
- Help with communication amongst interprofessional team members

Student Summary of Functional Abilities and School Therapy Goals

Name: Date(s):

School: Category Designation:

Diagnosis:

Fine Motor or MACS (CP):

Gross Motor or GMFCS (CP):

Eating and Drinking or EDACS (CP):

Communication or Communication Function Classification System (CFCS):

Equipment:

Vision

Hearing:

Psych Ed:

Technology:

Goals:

Therapist Name:

Resources - Measurement Instruments

Rehabilitation Measures Database
http://www.rehabmeasures.org/default.aspx

McMaster website: Research Articles of Outcome Measures
http://cpnet.canchild.ca/en/outcome-measures-research-articles.asp

Child Development & Rehabilitation website
http://www.childdevelopment.ca/best.aspx

TherapyBC
http://www.therapybc.ca/eLibrary/resources.php

The Children's Trust (Brain Injury Measures)
http://www.thechildrenstrust.org.uk/page.asp?section=1805

Cerebral Palsy Alliance – About CP
https://www.cerebralpalsy.org.au/about-cerebral-palsy/

About CP – Assessments and Outcome Measures
https://www.cerebralpalsy.org.au/about-cerebral-palsy/assessments-and-outcome-measures/

The Center for Outcome Measurement in Brain Injury (COMBI)
http://www.tbims.org/combi/

Spinal Cord Injury Rehab Evidence (SCIRE)
Common Measures used in SCI Clinical Practice are available for download here:
http://www.scireproject.com/outcome-measures

Stroke Engine - Common Assessments used in Stroke Clinical Practice
http://www.strokengine.ca/assess/

Archives of Physical Medicine has a section on measurement tools
http://www.archives-pmr.org/content/measurementtools

HaPI – Health and Psychosocial Instruments
http://www.bmdshapi.com/index.html

Systematic Reviews of Measurement Instruments – COSMIN
http://www.cosmin.nl/Ssystematic-reviews-of-measurement-properties.html

Critical Appraisal Tools:

- CanChild:
http://www.canchild.ca/en/canchildresources/resources/measrate.pdf
- CDR Evidence Center:
www.childdevelopment.ca/Libraries/Evidence_Center_Step4/E4P_Measurement_Overview_Template.sflb.ashx

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