Review of Motor Assessments for School-aged Children and Adolescents

Presented by Amy Schulenburg
Consultant OT - Pearson Clinical Assessment (Aust & NZ)

Why assess motor skills?
- Establish baseline
- Funding eligibility
- Intervention planning
- To determine if motor skill deficits are impacting functional performance
- Outcome measure for assessing effectiveness of intervention

Potential challenges in assessing motor skills
- Time to complete assessment
- Space to complete assessment
- Cognitive or communication delays
- Limited attention or challenging behaviours
- Severe motor impairment
- Performance on a standardised motor assessment might not accurately capture motor competence or deficit in functional activities

Movement Assessment Battery for Children, 2nd edition (MABC-2)
Sheila E Henderson
David A Sugden
Anna L Barnett

Overview
- Motor assessment
  - “Identifies, describes and guides treatment of motor impairment”
  - Subtests: Manual Dexterity, Aiming and Catching, Balance (6 items total per age band)
    - Age Range: 3 yrs – 16 yrs 11 months divided into 3 age bands:
      - 3.0 – 6.11
      - 7.0 – 10.11
      - 11.0 – 16.11
  - Teacher Checklist
  - Separate intervention manual
  - Administration time 20 – 30 minutes

Primary Uses
- Identification of delay or impairment in motor development
- Comparison of fine motor vs gross motor skills
- Plan intervention programs
- Measure change as a result of intervention
- Research involving motor development
Layout of manual

Age Band 1 tasks

Table 2a: Brief summary of changes made to A81 – now covers ages 3 to 6 years

<table>
<thead>
<tr>
<th>Task</th>
<th>Movement ABC A81</th>
<th>Movement ABC-2 A81</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posting Coins</td>
<td>Posting Coins</td>
<td>Posting Coins</td>
</tr>
<tr>
<td>Threading Beads</td>
<td>Threading Beads</td>
<td>Threading Beads</td>
</tr>
<tr>
<td>String Tub</td>
<td>String Tub</td>
<td>String Tub</td>
</tr>
<tr>
<td>Aiming &amp; Catching 1</td>
<td>Catching Beanbag</td>
<td>Catching Beanbag</td>
</tr>
<tr>
<td>Aiming &amp; Catching 2</td>
<td>Rolling Ball into Goal</td>
<td>Throwing Beanbag onto Mat**</td>
</tr>
<tr>
<td>Balance 1</td>
<td>One Leg Balance</td>
<td>One Leg Balance</td>
</tr>
<tr>
<td>Balance 2</td>
<td>Walking Hands Raised</td>
<td>Walking Hands Raised</td>
</tr>
<tr>
<td>Balance 3</td>
<td>Jumping over Cord</td>
<td>Jumping on Mat**</td>
</tr>
</tbody>
</table>

* Alternate item: shape of tool has changed
** New item

Posting Coins

• Each hand is tested
• 6 coins for 3-4 yr olds
• 12 coins for 5-6 yr olds
• Maximum of 2 trials

Threading Beads

• 6 beads for 3-4 yr olds
• 12 beads for 5-6 yr olds
• Maximum of 2 trials

Drawing Trail Age Band 1

Catching Beanbag (10 attempts)
### Throwing Beanbag onto Mat (10 attempts)

**One-Leg Balance**

- Each leg is tested
- Maximum time 30 seconds
- Maximum of 2 trials per leg

### Walking Heels Raised

- 4.5m line
- Maximum of 2 trials
- Maximum score = 15 steps or when child reaches end of line

### Jumping on Mats

**Set up and start position**

### Age Band 2 tasks

**Table 2b: Brief summary of changes made to A82 and A83 – now labelled A82 and covers ages 7 to 10 years**

<table>
<thead>
<tr>
<th>Task</th>
<th>Movement A82</th>
<th>Movement A83</th>
<th>Movement A82</th>
<th>Movement A83</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual Dexterity 1 Placing Pegs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual Dexterity 2 Throwing Lens</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual Dexterity 2 Throwing Hubs on Belt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual Dexterity 2 Throwing Hubs on Knees</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual Dexterity 3 Flower Trail</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual Dexterity 3 Flower Trail</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amming &amp; Catching 1 One-hand throwing &amp; Catch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amming &amp; Catching 2 Throwing Hubs into Box</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amming &amp; Catching 2 Throwing Hubs into Box</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance 1 Steady Balance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance 2 Jumping in Squares</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance 3 Hurdling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance 3 Hurdling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance 3 Hurdling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- New start position/habit
- * Laying board not longer
- * Shape of ball has changed
- ** Mat with target now used instead of box
- *** Mats used for this task

### Placing Pegs

- Each hand is tested
- Dominant hand first
- Start timing when free hand leaves mat
- Pegs can be inserted in any order
- Maximum of 2 trials per hand
Threading Lace

Start position

Drawing Trail Age Band 2

Catching with Two Hands

Action ages 7-8
Action ages 9-10

Throwing Beanbag onto Mat

- Ten attempts
- A hit is counted when any part of the beanbag touches the circle
- A throw that bounces or slides onto circle after landing does not count

One-Board Balance

- Each leg is tested
- Maximum score is 30 seconds
- Board must not tilt such that a side touches the floor
- Child must wear trainers

Walking Heel-to-Toe Forwards

- 4.5m line
- Heel of front foot must touch toes of rear foot
- Maximum = 15 steps or when child reaches end of line
- Maximum of 2 trials
**Hopping on Mats**
- Child starts by standing on one foot
- 5 continuous hops
- Must finish in a controlled manner
- Each leg is tested
- Maximum of 2 trials per leg

---

**Age Band 3 tasks**

<table>
<thead>
<tr>
<th>Task</th>
<th>Movement ABC</th>
<th>Movement ABC 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual Dexterity 1</td>
<td>Turning Pegs</td>
<td>Turning Pegs</td>
</tr>
<tr>
<td>Manual Dexterity 2</td>
<td>Cutting-Eat Elephant</td>
<td>Triangle with Nuts and Bolts*</td>
</tr>
<tr>
<td>Manual Dexterity 3</td>
<td>Rover Trail</td>
<td>Drawing Trail 3*</td>
</tr>
<tr>
<td>Aiming &amp; Catching 1</td>
<td>One-Hand Catch</td>
<td>Catching with One Hand</td>
</tr>
<tr>
<td>Aiming &amp; Catching 2</td>
<td>Throwing at Wall Target</td>
<td>Throwing at Wall Target</td>
</tr>
<tr>
<td>Balance 1</td>
<td>Two-Board Balance</td>
<td>Two-Board Balance</td>
</tr>
<tr>
<td>Balance 2</td>
<td>Jumping and Catching</td>
<td>Walking Toes to Feet Backwards</td>
</tr>
<tr>
<td>Balance 3</td>
<td>Walking Backwards</td>
<td>Zig-Zag hopping*</td>
</tr>
</tbody>
</table>

* New task
* Shape of trail has changed

---

**Turning Pegs**
- Each hand is tested
- Start timing when free hand leaves mat
- Pegs can be placed in any order
- Maximum of 2 trials per hand

---

**Triangle with Nuts and Bolts**

**Drawing Trail Age Band 3**
- Each hand is tested
- Child stands behind line 2m from wall
- No bounces allowed
- Ten attempts with each hand

---

**Catching with One Hand**
- Each hand is tested
- Child stands behind line 2m from wall
- No bounces allowed
- Ten attempts with each hand
**Throwing at Wall Target**

- Child stands behind line 2.5m from wall
- Lower edge of target level with top of child’s head
- Ten attempts

**Two-Board Balance**

- Narrow part of board facing up
- Maximum time is 30 seconds
- Sides of feet should not touch base of boards
- Maximum of 2 trials
- Child must wear trainers

**Walking Toe-to-Heel Backwards**

- 4.5m line
- Toe of rear foot must touch heel of front foot
- Maximum score = 15 steps or when child reaches end of line

**Zig-Zag Hopping**

- Each leg is tested
- Child hops once on each mat
- No pausing between hops
- Must finish in a controlled manner
- Maximum of 2 trials per leg

**Example of Item Scoring**

**Manual Dexterity 1: Posting Coins**

<table>
<thead>
<tr>
<th>Task</th>
<th>Age Band 1</th>
<th>Age Band 2</th>
<th>Age Band 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error in placing coins in tray</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Number of times coin does not fall into slot</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Number of times coin is placed in wrong slot</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Number of times coin does not fall into slot due to incorrect task requirements</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

**Qualitative observations:**

- Difficulty placing coins in tray
- Difficulty placing coins in correct slot
- Difficulty following task requirements

**Scoring**

- Colour coded record forms
  - Age Band 1 = red
  - Age Band 2 = green
  - Age Band 3 = blue

- Scores available
  - Item standard scores (mean 10, SD 3)
  - Component standard scores and percentiles
  - Total assessment standard score (mean 10, SD 3) and percentiles
Scoring
Appendix B pages 167-176 of manual

- Percentile cut-offs:
  - ≤5th percentile = significant motor difficulty
  - 6% - 15th percentile = careful monitoring suggested
  - >15th percentile = no significant motor difficulty

- Can record qualitative observations and factors that may have affected performance
- Compare non-motor factors between school and therapist observations

Scoring

<table>
<thead>
<tr>
<th>Item</th>
<th>Method of Score</th>
<th>Total Motor Score</th>
<th>Total Motor Cut scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>A1.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2</td>
<td>A2.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2.4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Checklist Scoring
Norms for 5-12 year olds

- Calculate totals for each section:
  - If <3 items marked ‘Not Observed’ you cannot obtain total score

- Total Motor Score = Section A + Section B

- Total Motor Cut scores:
  - Red Zone – definite movement difficulties
  - Amber Zone – at risk or needs further investigation
  - Green Zone – no apparent movement difficulties

Teacher Checklist

- Section A – Static/Predictable environment
  - Self-care skills
  - Classroom skills
  - PE / recreational skills

- Section B – Dynamic/Unpredictable environment
  - Self-care / Classroom skills
  - Ball skills
  - PE / recreational skills

- Section C
  - Non-motor factors that influence movement e.g. impulsivity, distractibility, persistence, anxiety
**Ecological Intervention Handbook**

**Reliability and Validity**

- Takes into account studies from Movement ABC-1 and studies with Movement ABC-2 (items with the lowest reliability were removed)
- Test-retest reliability 0.73-0.84 (total test score 0.80)
- Content validity established via expert panel
- Discriminative validity study showed differentiation of children with DCD and Asperger's Syndrome
- Correlation studies for criterion-related validity with M-ABC considered to be relevant to M-ABC:
  - Bruininks-Oseretsky Test of Motor Proficiency (1978)
  - Beery Test of Visual Motor Integration (1967)

**Advantages**

- Different tasks depending on age
- No standardised verbal instructions (bullet-point guidelines)
- Short admin time
- Teacher checklist to take into account performance in typical environment
- Observations check boxes to guide clinical observations
- Separate Intervention manual
- Contrasting colours to assist children with visual impairment
- Floor mats for reduced set up time (still some use of tape)

**Examples of clinical use**

- Screening purposes (is there a clinically significant problem?)
- Children with receptive language issues
- Children with limited cognitive ability
- Children with poor attention
- Children who are guaranteed to fail but need a standardised score for funding
- When time is limited
- Research

**Potential drawbacks**

- Only 8 items per age band
- Missing common tasks e.g. cutting
- Component skill focused
- UK norms
- Requires clinical experience to assess underlying factors e.g. tone

**Bruininks-Oseretsky Test of Motor Proficiency - 2**

Robert H Bruininks & Brett D Bruininks
Published: 2005
Overview

Age range: 4 to 21 years
Administration time 45-60 min for entire assessment, 10-15 min per composite

Purpose:
• Comprehensive and reliable assessment of fine and gross motor skills

Core areas assessed:
• Fine Manual Control
• Manual dexterity
• Upper-limb coordination
• Body Coordination
• Bilateral coordination
• Strength
• Balance
• Strength and Agility
• Running speed & agility
• Strength

Primary Uses

• Assess the motor proficiency of all children, ranging from those who are typically developing to those with mild to moderate motor control problems
• Support diagnosis of motor impairments
• Develop and evaluate motor training programs
• Screen individuals who may have certain deficits in motor ability and who might benefit from further evaluation or interventions (short form)
• Research

Layout of the Administration Easel

• Each subtest has an introductory page in the administration easel which includes:
  - Content: All of the items that make up the subtest, in the order they should be administered
  - General directions: Specific instructions that pertain to administering the items of that subtest
  - Diagrams and photos: This info is included when parts of the running course or targets are used to show proper set-up

Subtest 1: Fine Motor Precision

• 7 items
• 5 drawing items including filling in shapes, drawing lines through paths and connecting dots
• 1 folding item
• 1 cutting item
• Subtests are untimed as focus is on precision

Subtest 2: Fine Motor Integration

• 8 items
• Child copies shapes of increasing complexity from circle up to overlapping pencils
• Multi-faceted scoring:
  - Basic shape
  - Closure
  - Edges
  - Orientation
  - Overlap
  - Overall Size
Subtest 3: Manual Dexterity

- 5 items
- Goal-directed activities that involve reaching, grasping and bi-manual coordination with small objects.
  - Making dots in circles
  - Transferring coins
  - Threading beads
  - Sorting cards
  - Pegs in a pegboard
- Emphasis is on accuracy but items are timed to differentiate levels of dexterity.

Subtest 4: Upper-Limb Coordination

- 7 items
- Designed to measure visual tracking with coordinated arm and hand movements.
  - Catching
  - Dribbling
  - Throwing
- 4 items require the use of one hand
- 3 items require coordination of both hands

Subtest 5: Bilateral Coordination

- 7 items
- Tasks require body control and sequential and simultaneous coordination of upper and lower limbs.
  - Picking fingers and thumbs (itsy bitsy spider)
  - Touching nose with index fingers
  - Tapping foot and fingers
  - Jumping jacks
  - Jumping in place same side/alternate side synchronised
- Measures motor skills involved in sports and recreation.
  - Some will likely be familiar tasks while some will be novel.

Subtest 6: Balance

- 9 items
- Measures stability of trunk, static balance and movement and proprioception or use of visual cues.
  - Standing on both feet
  - Standing on one foot
  - Standing on floor
  - Standing on balance beam
  - Walking forward on a line
- 3 items require eyes to be closed

Subtest 7: Running Speed & Agility

- 5 items
- Provides opportunity to observe gait in running v. walking.
  - Shuttles run
  - Hopping tasks
  - Lateral movements

Subtest 8: Strength

- 5 items
- Designed to measure trunk, upper and lower body strength.
  - Standing long jump
  - Push-ups (knee or full)
  - Sit-ups
  - Wall sit
  - V-up
- Included because often motor delay is impacted by underlying weakness.
Scoring

- All items within a subtest are administered to all children (no basal or ceiling)
- A raw score is recorded for each item and could be:
  - A number of points
  - A number of correct activities performed (steps, jumps, catches, sit-ups, etc.)
  - A number of seconds
- After recording the raw score for each item, you must convert the raw score into a point score. For items on which two trials were administered, always convert the better of the two raw scores.

Additional Observations

- The authors of the assessment encourage clinicians to document observations in addition to the scores in the notes and observations section at the end of each subtest. Some ideas of observations are:
  - Examinee’s attitude
  - Examinee’s effort
  - Examinee’s behaviour
  - Specific strategies the examinee used to complete the task
- Additionally on the back of the record form is a space to make behavioural observations including attention, fluidity of movement, effort and understanding.

Score Reporting

- Note: When converting point scores into scaled scores or standard scores, you need to decide if you want to use gender-specific norms or combined-gender norms. The authors advise using gender-specific norms.
- On the cover of the record form, there are spaces to report on:
  - Subtest Scores
    - Point Score
    - Scaled Score (Mean=15, SD=5)
    - Confidence Interval
    - Age Equivalent
    - Descriptive category
  - Composite Scores (Fine Manual Control, Manual Coordination, Body Coordination, Strength & Agility, Total Motor)
    - Standard Scores (mean of 50, SD of 10)
    - Confidence Interval
    - Percentile Rank
    - Descriptive Category

Score Reporting Continued

- Pairwise comparison
  - Allows comparison between two subtest scaled scores or composite standard scores to determine if there is a statistical difference between performance areas.
  - Also allows for comparison to the frequency of that particular difference in the normed population.

Score Reporting Continued

- Scaled scores and standard scores provided the clearest indication of an examinee’s performance.
  - Allows comparison to the norm (how far above/below the mean the client is performing)
  - Allows comparison between subtests
  - Allows comparison for an individual’s performance over time.
- Age equivalents and percentiles should be reported using extreme caution because they are often misleading.
- Using confidence intervals allows for a less rigid interpretation of scores and helps prevent misinterpretation.
Q-Global Online Scoring & Reporting

BOT-2 Short Form
(Note: this is different than the BOT-2 Brief)

- Contains 14 total items
- Used as a motor screener for further evaluation/assessment or can be used as a program re-evaluation or when only a single score is necessary
- At least one item from each of the BOT-2 Subtests
- Yields one total score of motor proficiency reported as:
  - Standard score
  - Confidence interval
  - Percentile rank
  - Descriptive category
- Takes 15-20 minute to complete
- All required materials and scoring sheets are included in complete BOT kit/forms

Statistical properties of BOT-2: Reliability

<table>
<thead>
<tr>
<th>Subtest</th>
<th>Internal Consistency</th>
<th>Test-Retest Reliability</th>
<th>Interrater Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine manual Control</td>
<td>.85-.90</td>
<td>.52-.82</td>
<td>.92</td>
</tr>
<tr>
<td>Manual Coordination</td>
<td>.86-.89</td>
<td>.68-.76</td>
<td>.98</td>
</tr>
<tr>
<td>Body Coordination</td>
<td>.87-.89</td>
<td>.65-.83</td>
<td>.95</td>
</tr>
<tr>
<td>Strength &amp; Agility</td>
<td>.86-.92</td>
<td>.84-.91</td>
<td>.99</td>
</tr>
<tr>
<td>Total Motor Composite</td>
<td>.95-.96</td>
<td>.80-.88</td>
<td>.98</td>
</tr>
<tr>
<td>Short Form</td>
<td>.82-.97</td>
<td>.84-.91</td>
<td>.97</td>
</tr>
</tbody>
</table>

Note: These are reported in ranges because they broke down the reliability studies by age and also by whether the examinees did knee push-ups or full push-ups.

Statistical Properties of BOT-2: Validity

<table>
<thead>
<tr>
<th>Content Validity</th>
<th>Criterion Validity</th>
<th>Construct Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content development influenced by focus groups, surveys, professional consultation, research and motor development theory</td>
<td>Correlation b/w BOTMP and BOT-2 Total Motor Composite = .80</td>
<td>Subtests correlate to composite scores: .75 - .90</td>
</tr>
<tr>
<td>Additional content validity evidenced through measures of item fit through factor analysis.</td>
<td>Correlation b/w PDMS-2 Total Motor Quotient and BOT-2 Total Motor Composite = .73</td>
<td>Factor analyses provide strong support for the four motor-area composites for all age groups. All values &gt;.95</td>
</tr>
<tr>
<td>Additional evidence supporting link b/w BOT-2 subtests and the construct of motor skills achieved through natural progression of motor skills by age and differences in performance based on sex.</td>
<td>Evidence of validity for identifying motor performance deficits in children with: DCD Mild – Mod ID High functioning autism/Asperger's</td>
<td></td>
</tr>
</tbody>
</table>

Advantages

- Comprehensive assessment of motor skills
- Uses goal-directed activities to assess skills
- Can pick & choose subtests (don't need to administer complete assessment to get scores)
- Task instructions can be tailored depending on child's needs
- Strong psychometric properties. In particular, interrater reliability makes for consistent results
- Scoring and reporting can be done online
- Can use short form as a screener without needing to buy anything additional

Examples of clinical use

- A child has been flagged as delayed on a screening assessment and you need something more comprehensive
- When you need to support a diagnosis of motor impairment
- To develop highly tailored intervention plans
- To assess the efficacy of an intervention
- To support funding applications
- Can use Short Form as a screening tool
- Research
Limitations of the BOT-2

- Takes a long time to administer if you are doing all sections
- All items within a subtest need to be administered (no cut-off or stop point) can be frustrating for younger or severely delayed children
- Does not include a questionnaire to assess functioning in typical environment (need to do separate clinical observations)
- Does not have an intervention guide that goes along with it

Overview

- “An evaluation of fundamental motor abilities needed for daily living”
- For ages 7 – 17
- 45-60 minute administration time
- Originates from theory/research in sensory integration and motor development
- Seven activities:
  - Utensils
  - Locks
  - Paper Box
  - Notebook
  - Clothes
  - Tray Carry
  - Ball Play

Primary Uses

- Designed to facilitate effective assessment and treatment of sensory and motor difficulties affecting function
- Functional goal setting and measuring progress against functional tasks
- Recommended for therapists with background knowledge of SI approach
- Often yields useful information regarding praxis
- When a child is functioning developmentally at the lower end of the age range
- Complement more bottom-up tools e.g., BOT-2 or Movement ABC-2

What the Administration Easel Looks Like (Therapist’s View)
Activities in the GOAL

Utensils
• Child uses a knife and fork to cut a length of play-dough into 10 pieces
• Child spears each piece and places on a paper towel

Activities in the GOAL

Utensils
• Child uses a spoon to sip water and scoop it from one cup into another

Activities in the GOAL

Locks
• Child opens a key padlock and a combination padlock

Activities in the GOAL

Paper Box
• Child constructs a paper box by colouring in pictures, cutting along lines, folding and taping the box together

Activities in the GOAL

Notebook
• Child opens a 3-ring binder, organises colour-coded dividers with corresponding coloured paper and closes binder.

Activities in the GOAL

Clothes
• Child puts on and takes off an over-sized t-shirt and shorts
**Activities in the GOAL**

**Ball Play**
- Child dribbles a ball, bounces ball from hand to hand, bounces ball against wall and catches it, kicks ball against wall.

**Tray Carry**
- Child picks up a tray with two full cups of water and carries it across the room, stepping over obstacles, sitting down, standing back up and then kicks the obstacles out of the way on the way back before placing the tray back on the chair.

---

**Scoring the GOAL**

- Basic Step criterion must be achieved in order to register a score for that item (pass/fail)
- The child receives no credit if you provide any assistance
- Basic Step criteria are time-based
- The child may also gain credit for Bonus Steps on some tasks
- Items are scored according to criteria and corresponding box ticked on record form

**Scoring the GOAL**

- Scores are based on 54 Steps – small units of observable functional behaviour within the 7 activities
- Each Step is scored as pass or fail
- Step scores are summed to yield raw and standard scores for Fine Motor, Gross Motor and Progress scores
- Percentiles and Confidence Intervals provided
- Separate gender norms

---

**Interpreting the GOAL**

- GM and FM scores have a mean of 100 and SD of 15
- Determine whether differences between GM and FM are statistically significant
- Progress score is a single score representing overall performance and can be used to measure progress over time on successive administrations
Using the Progress Chart

- Circle passed steps in green and failed steps in red
- Plot the progress score with a solid line
- Add and subtract 50 then plot these numbers with dotted lines to define the Progress Range
- ‘Failed’ items to the left of the range can help identify treatment goals. ‘Passed’ items to the right are areas of strength

GOAL Intervention Targets

- The 23 GOAL intervention targets fall into 4 categories: sensory, postural, praxis and motor proficiency
- When planning intervention, clinical reasoning must be used in addition to the information derived from the GOAL record form
- Circle any areas that were unexpected ‘failures’ in red and any that were unexpected ‘successes’ in green.

Psychometric properties of the GOAL

- Internal consistency at or greater than 0.75
- Test-retest reliability 0.76 FM and 0.77 GM
- Convergent validity data collected for SIPT, SPM, BOT-2 and ABAS-II
- GOAL scores correlate significantly with SIPT praxis tests
- Non-significant correlation between GOAL scores and SPM home form scores but stronger correlation with SPM classroom scores, particularly Planning and Ideas
- Average correlation with BOT-2 of 0.62 for FM and 0.47 for GM
- Moderate correlation with Functional academics, Health and Safety and self-Care on ABAS-II

Advantages

- Top-down approach
- Functional activities
- Fun/engaging activities
- Intervention targets linked to tasks to help guide intervention
- Use of progress scores allows comparison to tasks as opposed to norms
Examples of clinical use

- If a child is having difficulty with functional tasks such as feeding/dressing this can highlight the motor areas impacting function.
- If a child has a more significant delay they may have an easier time participating in these tasks as they are familiar.
- For a lower functioning child where you want to measure progress over time in relation to tasks as opposed to norms.
- If you are using other SI based assessments or interventions (e.g. SIPT, SPM).

Limitations

- Limited scoring system (only yields standardised scores for gross motor/fine motor – no subtest or composite scores.)
- Potential ceiling effect
- Flimsy manipulatives
- Some items are very “American”
- Intervention targets limited to SI-based approach

Any questions?

amy.schulenburg@pearson.com
0407 259 317
(03) 9811 2907