How to Incorporate Motor Learning Strategies into Motor Skills-Based Interventions for Children with Cerebral Palsy

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Acknowledgements

Foundations in Motor Learning Strategies Research

• Documenting the Content of Physical Therapy for Children With Acquired Brain Injury: Development and Validation of the Motor Learning Strategy Rating Instrument (Levac et al., 2011)
• Reliability of the Motor Learning Strategy Rating Instrument for Children and Youth with Acquired Brain Injury (Kamath et al., 2012)

Current Research (core work of Masters thesis, J Ryan)

• Inter- and Intra-rater Reliability of the MLSRI-20 in Physiotherapy Intervention in Children with Cerebral Palsy
• Exploring how PTs use MLS in Gait-Based Physiotherapy Interventions for Children with CP
  – Committee: Virginia Wright, PT, PhD (supervisor), Danielle Levac, PT, PhD, Nick Reed, OT Reg.(Ont.), PhD
  – Funding: Bloorview Children’s Hospital Foundation Chair in Pediatric Rehabilitation

Learning Objectives

1. Understand how to incorporate motor learning variables into your clinical practice when teaching motor skills to children with CP
2. Describe 20 different motor learning strategies (MLS) and understand how each is operationalized
3. Explain how a therapy session can be organized to promote motor learning through the use of MLS
4. Identify the MLS used by therapists as part of an intervention, as viewed from treatment session videos
What Motor Learning Strategies Do You Observe in Lucas’ Session?

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What is Motor Learning?

Motor learning is the relatively **permanent change** in a motor skill, achieved through practice or experience, which can then be transferred to new learning situations.

(Schmidt, 2004)
Assessment of Motor Learning

Retention - persistence of a motor skill after a period of time in which the skill has not been practiced

Transfer - ability to perform the skill in a new situation or perform a novel variation of the skill

Motor Learning Strategies (MLS)

Observable therapeutic actions involving the selection, manipulation, and application of motor learning variables based on client- and task-specific factors in order to promote motor learning.

(Levac et al., 2011)
Motor Learning Strategies

- How the Practice is Organized
- What the Therapist DOES
- What the Therapist SAYS

Factors Influencing MLS Use

- Client Learning Style
- Client Response to Use of MLS
- Goals of the Session
- Type of Intervention
- Therapist Preference

Holland Bloorview
Kids Rehabilitation Hospital
Motor Learning Beyond Therapy - MUSIC

http://takelessons.com/blog/new-ways-to-practice-scales-206

Motor Learning Beyond Therapy - SPORTS

www.vcdm.org/coaches/resources/motor-learning-principles
### Current Evidence Using MLS

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<th>Method</th>
<th>Description</th>
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<td>Constraint induced movement therapy (Hoare et al., 2007)</td>
<td>Massed practice of movement to the affected upper limb</td>
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<td>Goals-Activity-Motor Enrichment – infants + parents (Morgan et al., 2014)</td>
<td>As performance improves, motor challenge is increased by altering task or environment to encourage problem solving. Manual assistance is reduced/withdrawn when infant demonstrates self-initiated progress. Variability of practice is introduced to increase complexity, generalizability</td>
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<td>Gait training intervention – older adults (Brach et al., 2013)</td>
<td>Goal-oriented, progressively more difficult stepping and walking patterns to promote timing and coordination within the phases of the gait cycle. Progression based on increasing speed, amplitude, or accuracy of performance before undertaking a more complex task.</td>
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<td>The effect of a motor skills training program in the Improvement of practiced and non-practiced tasks performance in children with DCD (Farhat et al., 2016)</td>
<td>Progressive program, week by week, adding on difficulty to gym skills. (Well-described but the same for all children!)</td>
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### Motor Learning Strategies Rating Instrument

- **Original MLSRI included 33 items** (Levac et al., 2011)
- **MLSRI inter- and intra-rater reliability study in children with acquired brain injury led to revisions of the measure** (Kamath et al., 2012)
- **Revised measure is the MLSRI-20** (created by Levac et al.)
  - User observes a video-recorded therapy session
  - Rates the extent to which each of the 20 MLS are used
  - Inter- and intra-rater reliability study underway in physiotherapy interventions for children with CP
How the Practice is Organized

1. Repetition

The extent to which the client participates in physical or mental practice throughout the session.

Why do it?

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1. Repetition
2. Whole Practice (rather than part)

Tasks are practiced as a whole skill rather than decomposing the task into components/parts.

*Why do it?*

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3. Variable Practice (rather than constant)

Variation occurs **within a single task**. It may include changing positions, type of movement, adding another element to the task, or changing the equipment used.

*Why do it?*

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4. Random Practice  (rather than blocked)

Involves returning to practicing a task within a single therapy session after working on at least one different task (e.g., A-B-C-A-D).

Why do it?

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5. Progress the Task

Increasing the difficulty of a task by adding either physical or cognitive demands.

Why do it?

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What the Therapist DOES

6. Modelling/Demonstration

The therapist physically demonstrates or models skills/tasks for the client during the therapy session.

Why do it?

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7. Provide Physical Guidance

Handling, either facilitation or inhibition, for the purpose of executing or learning the task

Why do it?

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8. Permit Errors as Part of Learning

Allowing mistakes during practice may include, but is not limited to: progressing the challenge of the task, decreasing physical guidance, limiting verbal (telling) feedback, and/or allowing the child to figure out a movement.

Why do it?

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9. Recommend practice outside therapy

Explicitly asking the client to practice a task **mentally** or **physically** outside of therapy time

*Why do it?*

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10. Provide education to child or caregiver

Provide information about the client’s **condition**, his/her immediate **task performance**, or instructions about **components required** to complete the task.

*Why do it?*

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What the Therapist SAYS

11. Encouragement

Positive/reassuring statements that **do not** contain information **directly relevant** for learning the task

*Why do it?*

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12a) Instructions- External Focus of Attention

Directs the child toward the **object** or the effects of actions/movements on the **environment**

The person doesn’t need to think about body actions; the **movement is more automatic**

*Why do it?*

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12b) Instructions – Internal Focus of Attention

Directs the learner towards own body movements, quality of movement, and/or actions. Often provides enough information to **override an individual’s automatic movement**

*Why do it?*

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13. Asking (rather than telling)

Encourage the person to think, reflect, and/or problem-solve through a process through asking **open-ended questions** or having the child **verbalize/demonstrate** a task.

*Why do it?*

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14. Feedback

14a) Feedback- Movement Performance

**Knowledge of performance** feedback provides information about how the movement was performed: i.e. the movement nature or quality.

*Why do it?*

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14b) Feedback- Results

**Knowledge of results** feedback is information relating to the outcome of the action or the goal.

*Why do it?*

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14c) Feedback- What was done well

Feedback that provides specific information related to **successful aspects** of the movement/results.

*Why do it?*

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________________________________________________________________________
14d) Feedback- What was done poorly

Specific information related to movement/results that need improvement, with or without suggesting ways in which the person could improve.

Why do it?

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15. Link a task to another task/setting

Explicitly connecting the task being practiced in therapy to a similar task (within or beyond therapy) or connecting the same task to practice in a different setting.

Why do it?

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16. Mental Practice

The act of rehearsing the skill in one’s imagination with no movement involved.

Why do it?

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Case Study - Olivia

- 7 year old girl with spastic diplegic cerebral palsy, GMFCS II/III
- Psychosocial information:
  - Lives with her parents, her TD twin sister, Emma, 4-year old brother, Thomas, and the family dog, Coconut
  - Both parents work full-time and alternate who brings Olivia to therapy
- Other information:
  - Works at grade level with EA support
  - Enjoys music and watching sports
  - Has a good sense of humour
  - Is fearful of falling when walking in busy environments
  - Walks without a walker at home but uses a walker at school and in the community
  - Follows multistep directions
Olivia’s Goals

- Get her own clothes on when getting ready for school
- To feed and brush Coconut
- To walk in the classroom without a walker
- To fall less when playing soccer with her family

Case Study - Olivia

- Plan your 1st treatment session with Olivia, addressing any or all goals pertinent to your profession. Include 4-5 tasks.
- Describe the following:
  - How you will organize your session
  - Your initial plan for how you will instruct Olivia (it may differ from task to task)
  - Any homework you will recommend between now and her second treatment session next week
  - Two other MLS that you plan to incorporate into the session
- After 6 weeks, Olivia is making progress. From a MLS perspective, how do you anticipate your treatment sessions will differ from the 1st session?
Let’s revisit Lucas’ PT session

Motor Learning Strategies
Online Training Module*

- An interactive training module with definitions, video examples, quizzes, case studies.
- A fifth module for the MLSRI-20 is currently being created with future opportunity to certify.
- If you want access to the Motor Learning Strategies Online Training Module, please email motorlearningfriends@gmail.com.
- Once you sign a user agreement, we will arrange to have a user name and password sent to you, which will provide access to this interactive module.

* Ryan J, Levac D, Wright V: Online Training Module and the Instruction Manual for the MLSRI-20, Bloorview Research Institute, Toronto, Canada, 2017
Take Home Messages

- MLS: You are probably already using them!
- There is **more than one way** to use MLS
  - Child, session, therapist factors
- Not all MLS will work for each client; need to **individualize**
- **Explicit statements** can be helpful in increasing understanding in certain scenarios
- Planning prior to a treatment session is the first step in successfully using MLS with **intention** in your practice

References


