An Evidence Based Occupational Therapy Toolkit for Assessment and Treatment of the Upper Extremity Post Stroke

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(Winnipeg Health Region Upper Extremity Working Group)
Issues:
• Great variability in the delivery of upper extremity rehabilitation across Manitoba
• Therapists identified the need for increased knowledge to improve the consistency of upper extremity therapy practice

Goals:
• Consistent use of best practice upper extremity interventions
• Practical interpretation of best practice guidelines
• Consistent upper extremity therapy practice across the stroke rehab continuum of care
• Improved clinical decision making
Solution:

Development of a practical upper extremity Toolkit based on:

- 2013 Canadian Best Practice Recommendations for Stroke Care - Upper Extremity Sections
- 2013 Evidence Based Review of Stroke Rehabilitation
- Clinical expertise: acute, rehabilitation, outpatient and community
Toolkit consists of a **model** for upper extremity management:

- Screening guidelines
- Determining upper extremity level guidelines
- Assessment considerations and tools
- Goal setting recommendations
- Treatment interventions including practical resources
Model

1. Screen UE Function
2. Determine UE Level:
   - Low
   - Intermediate
   - High
3. Assess UE based on level
4. Determine UE goals
5. Treat UE based on level
6. Reassess UE
Screening Guidelines

Clients should be assessed within the first 48 hours post stroke (Canadian Best Practice Recommendations 4.1, 2013). An initial screen of upper extremity function is crucial at all points of the rehabilitation continuum of care.

Screening will:

• determine further assessments required
• assist with goal setting
• assist with the choice of treatment modalities to best promote recovery and prevent complications
Screening Examples

- Palpate for subluxation and observe for edema
- Motor function: ask questions (shoulder, elbow, wrist, hand)
  Example: “Can you raise your arm to the side? Can you open your hand all the way? Squeeze both my hands.”
- Sensation: “Does this side feel the same as this?”
- Pain: “Do you have any pain at rest? With movement?”
- Functional use: “Are you able to use your arm for feeding, grooming, etc.?”
Determining Upper Extremity Level

- Acts as a starting point
- Assists with therapeutic decision making
- Once “level” determined can use Assessment and Treatment Matrices to guide therapy
- Completion of Chedoke McMaster Stroke Assessment Arm and Hand Stages recommended
- Goal: progress client to the next level
## Upper Extremity Levels

<table>
<thead>
<tr>
<th>Determinants</th>
<th>Low level</th>
<th>Intermediate level</th>
<th>High level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chedoke McMaster Stroke Assessment</td>
<td>• Arm stage 1-2 &lt;br&gt;• Hand stage 1-2</td>
<td>• Arm stage 3-5 &lt;br&gt;• Hand stage 3-5</td>
<td>• Arm stage 6-7 &lt;br&gt;• Hand stage 6-7</td>
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<td>Arm Movement and Function</td>
<td>• Incompletely selective movements (small amplitude, non-functional)</td>
<td>• Biomechanical and muscle imbalance with incompletely selective movements</td>
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<td>• Primarily used for stabilization tasks</td>
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<td>• Primarily used for manipulation tasks with emphasis on speed, accuracy, and quality of movements</td>
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Model

1. Screen UE Function
2. Determine UE Level
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Assessment Guidelines

• Upper Extremity Level has been determined as low, intermediate or high

• Assessment Matrix can then be used to help choose appropriate assessments, that will best measure change
## Assessment Matrix

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<tr>
<th>Assessment</th>
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<th>Intermediate Level</th>
<th>High Level</th>
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</thead>
</table>
| **Motor Function** | • Fugl-Meyer – UE  
• Functional use in daily activities  | • Fugl-Meyer – UE  
• CAHAI  
• WMFT/ARAT/Jebsen  
• Functional use in daily activities  | • Fugl-Meyer - UE  
• CAHAI  
• WMFT/ARAT/Jebsen  
• Functional use in daily activities  |
| **Coordination** | • Box and Block Test  
• Nine Hole Peg Test  
• Finger-Nose Test  
• Rapid Alternating Movement Test  | • Box and Block Test  
• Nine Hole Peg Test  
• Finger-Nose Test  
• Rapid Alternating Movement Test  | • Box and Block Test  
• Nine Hole Peg Test  
• Finger-Nose Test  
• Rapid Alternating Movement Test  |
| **Strength** | • MMT  | • MMT/grip/pinch  | • MMT/grip/pinch  |
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<th>Low Level</th>
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<th>High Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range of motion</td>
<td>• Active/active-assisted/passive</td>
<td>• Active/active-assisted/passive</td>
<td>• Active</td>
</tr>
<tr>
<td>Tone</td>
<td>• Modified Ashworth</td>
<td>• Modified Ashworth</td>
<td>• Modified Ashworth</td>
</tr>
<tr>
<td>Pain</td>
<td>• VAS/CMSA</td>
<td>• VAS/CMSA</td>
<td>• VAS/CMSA</td>
</tr>
<tr>
<td>Sensation</td>
<td>• Monofilaments</td>
<td>• Monofilaments</td>
<td>• Monofilaments</td>
</tr>
<tr>
<td></td>
<td>• Hot and cold</td>
<td>• Hot and cold</td>
<td>• Hot and cold</td>
</tr>
<tr>
<td></td>
<td>• Proprioception</td>
<td>• Proprioception</td>
<td>• Proprioception</td>
</tr>
<tr>
<td></td>
<td>• Stereognosis</td>
<td>• Stereognosis</td>
<td>• Stereognosis</td>
</tr>
<tr>
<td>Edema</td>
<td>• Circumference</td>
<td>• Circumference</td>
<td>• Circumference</td>
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<tr>
<td></td>
<td>• Volume</td>
<td>• Volume</td>
<td>• Volume</td>
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</tbody>
</table>
Goal Setting Guidelines

• Important for planning treatment and for determining progress with treatment
• Use of COPM suggested
• SMART goal setting

https://ehealth.heartandstroke.ca/HeartStroke/HWAP2/Goals.aspx
Goal Setting Guidelines

“Goal Setting 101”

Examples of SMART goals

• Client will eat all meals independently with left hand using built up utensils in 4 weeks.

• Client will increase Box and Block Test score to 21 (25%) in 4 weeks.
Treatment Guidelines

• Screening results + assessment results + client’s goals = choose treatment options that are best suited to the client’s level

• Task specific training: “The repeated, challenging practice of functional, goal-oriented activities” (Lang & Birkenmeier, 2014)

• Task-specific, meaningful to the client and easily graded for optimal challenge
<table>
<thead>
<tr>
<th>Specific Therapy</th>
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<th>High Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constraint Induced Movement Therapy</td>
<td>• Work toward minimal active movement requirements</td>
<td>• Work toward minimal active movement requirements</td>
<td>• Refer to CIMT program</td>
</tr>
<tr>
<td>Functional Dynamic Orthosis</td>
<td>• Work toward minimal active and passive movement requirements</td>
<td>• Use functional dynamic orthosis with goal of 2-45 minute sessions/day, followed by functional activity without orthosis</td>
<td>• Wean from functional dynamic orthosis</td>
</tr>
</tbody>
</table>
## Treatment Matrix

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</table>
| Functional Electrical Stimulation (FES) | • Target wrist extensors while engaged in task specific activities  
• Consider FES to reduce or prevent shoulder subluxation | • Target wrist extensors while engaged in task specific activities | —                                                                         |
| Mental Imagery                  | • Use as an adjunct/homework                                              | • Use as an adjunct/homework                              | • Use as an adjunct/homework                                              |
Sample script...mental imagery

“Today we are going to imagine you are reaching for a cup on the table....the cup is half full with water.”

“Bring your arm forward slowly toward the table/straighten your elbow.../open your fingers and thumb.../grasp the cup gently...”
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</table>
| Joint Protection and Supports | • Educate re: handling and joint protection when sitting, lying, mobilizing  
• Use slings with caution and only with frequent re-evaluation  
• Assess need for custom or prefabricated splint         | • Wean slings/splints  
• Consider shoulder girdle taping                          | • Consider shoulder girdle taping                   |
<table>
<thead>
<tr>
<th></th>
<th>Yes (for ambulation/transfers)</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased Tone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute Edema</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute Pain</td>
<td></td>
<td></td>
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<tr>
<td>Decreased sensation,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>perception, cognition</td>
<td></td>
<td></td>
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<tr>
<td>Less than 10 degrees</td>
<td></td>
<td></td>
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<tr>
<td>of active shoulder</td>
<td></td>
<td></td>
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<tr>
<td>movement in any plane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caregivers need reminder to not pull on arm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(adapted from L. Thalman, 2008)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific Therapy</td>
<td>Low Level</td>
<td>Intermediate Level</td>
</tr>
<tr>
<td>------------------</td>
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</tr>
</tbody>
</table>
| Spasticity Management | • Refer to physiatrist or spasticity clinic for medical management  
• Strengthen antagonist muscles post injection  
• Assess need for custom or pre-fabricated splint | • Refer to physiatrist or spasticity clinic for medical management  
• Strengthen antagonist muscles post injection | • Refer to physiatrist or spasticity clinic for medical management  
• Strengthen antagonist muscles post injection |
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</table>
| **Supplementary Training Programs** | • Use portions of Level 1 of Graded Repetitive Arm Supplementary Program (GRASP)  
• Provide individualized home program with daily homework book | • Use Levels 1-3 of GRASP  
• Provide individualized home program with daily homework book | • Provide individualized home program with daily homework book |
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| Sensory Stimulation and Re-training | • Implement protective sensation teaching  
• Encourage weight bearing positions  
• Encourage use of vision during functional activities | • Encourage use in functional activities  
• Transition from use of vision during functional activities to activities with vision occluded as safety permits | • Encourage use in functional activities  
• Advance to activities with vision occluded as safety permits |
| Mirror Therapy              | • Use as an adjunct/homework                                               | • Use as an adjunct/homework                                                         |                                                                                                 |
Sample script...mirror therapy

• “Watch the mirror...do these activities with your affected hand at the same time....”

• “Make a fist and then open hand fully/pretend to play the piano/touch your thumb to the tip of each finger/grasp a water bottle, let it go/pick up coins one at a time...”
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</thead>
<tbody>
<tr>
<td><strong>Range of Motion (ROM) and Strength Training</strong></td>
<td>Maintain/increase ROM through:</td>
<td>Maintain/increase ROM through:</td>
<td>Maintain/increase ROM through:</td>
</tr>
<tr>
<td></td>
<td>• Facilitation of active movement</td>
<td>• Active ROM with verbal and/or tactile cueing</td>
<td>• Active ROM while providing verbal and/or tactile cueing</td>
</tr>
<tr>
<td></td>
<td>• Progression from bilateral to unilateral activities</td>
<td>• Progression from bilateral to unilateral activities</td>
<td>• Strength training through available ROM</td>
</tr>
<tr>
<td></td>
<td>• Active-assisted ROM in sitting, supine, gravity reduced positions</td>
<td>• Active-assisted ROM in sitting, supine, or gravity reduced positions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Passive ROM</td>
<td>• Passive ROM</td>
<td>• Do not use pulleys</td>
</tr>
<tr>
<td></td>
<td>• Self ROM</td>
<td>• Self ROM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Strength training through available ROM</td>
<td>• Strength training through available ROM</td>
<td></td>
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<tr>
<td></td>
<td>• Do not use pulleys</td>
<td>• Do not use pulleys</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Monitor carefully if using pulleys</td>
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<td>Edema Management</td>
<td>• Encourage active, active assisted and passive movement</td>
<td>• Encourage active movement</td>
<td>• Encourage active movement</td>
</tr>
<tr>
<td></td>
<td>• Consider retrograde massage</td>
<td>• Consider retrograde massage</td>
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</tr>
<tr>
<td></td>
<td>• Educate re: positioning and elevation</td>
<td>• Educate re: positioning and elevation</td>
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</tr>
<tr>
<td></td>
<td>• Use compression techniques</td>
<td>• Use compression techniques</td>
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<tr>
<td></td>
<td>• Assess need for custom or pre-fabricated splint</td>
<td></td>
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<tr>
<td>Virtual Reality</td>
<td>• Use as an adjunct/homework</td>
<td>• Use as an adjunct/homework</td>
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</table>
Practical Resources....

• Task specific training guidelines as the “umbrella” with examples of how to adapt activities for each arm level
• Arm Activity Checklists
• CIMT: principles and how to refer
• Sample scripts for mental imagery and mirror therapy
• Bed and Chair positioning posters
Practical Resources....

• Splinting considerations and splint instruction handout
• Sling Me? guide
• Positioning Devices decision tool
• Links to GRASP (UBC)
• Self range of motion handout
• Sensation re-training practical examples
• Safety Tips For Decreased Sensation
Model

1. Screen UE Function
2. Determine UE Level
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6. Reassess UE
Reassessment

• Can include re-administering initial assessment tools and reviewing goals...has their UE level changed?
• Important to monitor functional progress and modify treatment plans
In summary...

This Toolkit is designed to:

• Improve client functional outcomes and quality of life
• Foster consistent use of evidence based UE interventions within and between practice settings
• Provide a framework for orienting new OT staff and students
Next steps…

• OT survey, April 2015
• Site visits locally, starting June 2015
• Repeat survey, November 2015
• Adapt Toolkit after release of 2015 Canadian Best Practice Recommendations for Stroke Care

http://www.wrha.mb.ca/professionals/occupational-therapy/index.php
Discussion

• How do you incorporate increased intensity/repetition into daily practice?
Discussion

• How do the barriers at your site presently impact the ability to provide best practice?
Discussion

• Do the arm levels (low, intermediate, high) reflect your current practice?
## Upper Extremity Levels

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• Primarily used for stabilization tasks | • Biomechanical and muscle imbalance with incompletely selective movements  
• Transitioning from stabilization to manipulation tasks | • Selective movements but lacks strength, dexterity, or coordination necessary for “normal” function  
• Primarily used for manipulation tasks with emphasis on speed, accuracy, and quality of movements |

(Adapted from Stevenson & Thalman, 2007)
Discussion

• How can you implement this Toolkit at your site?
Questions???

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• Leyda Thalman lthalman@sbgh.mb.ca