BARBARA ANN QUIRK AND IVONNE MONTGOMERY JUNE 5, 2018 OT KB MEETING

UPPERENTREMITY ATAMA

## PICO

 Among children and adolescents with acquired brain injury, does the use of strength training exercises, compensatory techniques, and adaptive devices lead to decreased upper limb ataxia\* and improved upper extremity function?

\*Upper Limb Ataxia and/or upper limb tremor is identified as a symptom of cerebellar lesions in addition to dyssynergia and dysdiadochokinesia

#### SEARCHING FOR EVIDENCE

#### DATABASE SOURCES

Trip Database	ABIEBR
CINAHL	Joanna Briggs
MEDLINE	Google Scholar
NICE	Up to Date
ABIKUS	
Rehabilitation Re	ference Center
Nat Guidelines C	learinghouse

#### SEARCH TERMS

Brain injury Child Ataxia Occupational therapy Tremor

#### SEARCHING FOR EVIDENCE

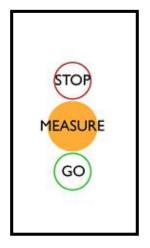
Search was replicated by:

Andrea Ryce, SHH clinical librarian

Stephanie Glegg, through TL vetting process

### BEST EVIDENCE IDENTIFIED

- No applicable article(s) found
- Yellow No evidence found



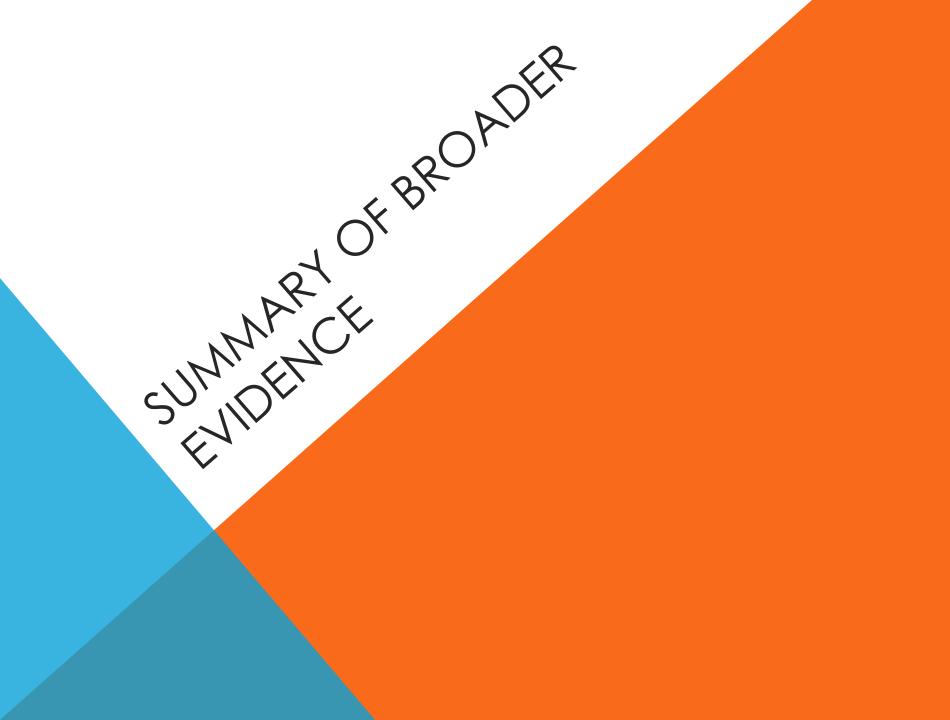
• Will be added to Traffic Lighting Database: <u>http://10.2.50.68/fmi/iwp/res/iwp\_home.html</u>



#### BROADER EVIDENCE

The best and most relevant evidence available at this time, to help manage ataxia in children and adolescents is based on:

- a clinical review article
- a primary research article (adult)
- health organization websites





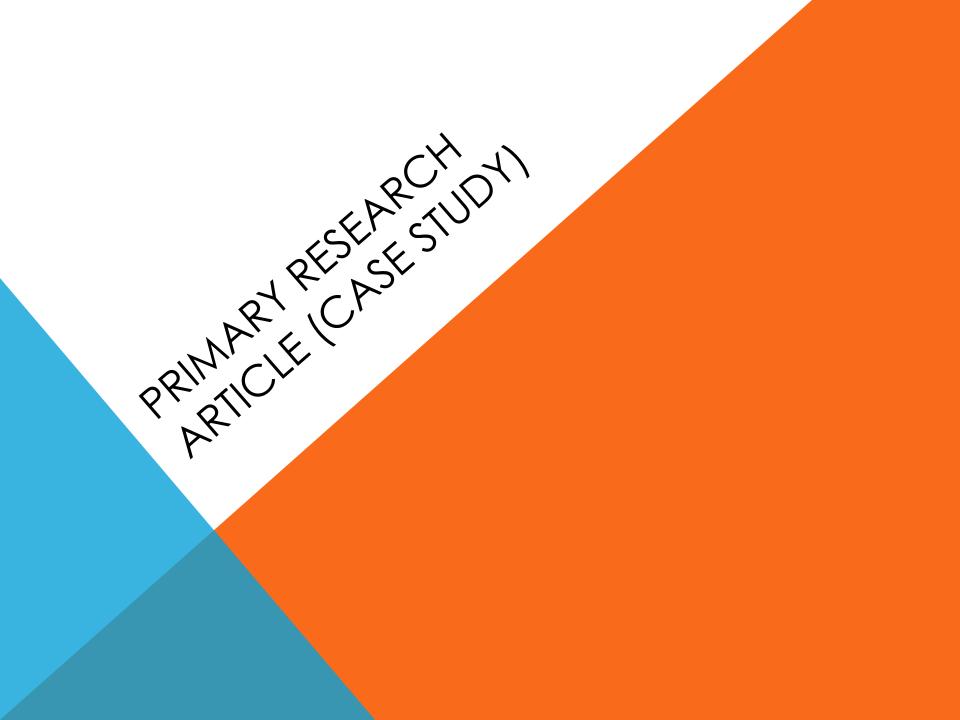
#### SNOOK, 2016

Snook, A. G. (2016). Clinical Review, Ataxia in Children, CINAHL Information Systems, Rehabilitation Reference Center



#### **RECOMMENDATIONS for Tx:**

- Focus on compensatory techniques for maintaining or improving participation
- Use of adaptive devices to maintain independence & assist with writing, eating, selfcare and communication
- Strength training



#### GILLEN, 2000

Gillen, G. (2000). Improving activities of daily living performance in an adult with ataxia. American Journal of Occupational Therapy, 54(1), 89-96.

#### STUDY DESCRIPTION:

- A case study of a 31-year-old man
- Interventions were aimed at :
  - <u>not</u> changing underlying movement capabilities
  - increasing postural stability
  - decreasing multi-joint movements
  - improving ADL performance

#### INTERVENTIONS:

- adapted positioning
- orthotic prescription
- adapted movement patterns
- use of the environment for trunk/limb stability
- Rx of adaptive ADL devices

#### FINDINGS:

- Increased independence and improved functioning of the targeted occupation (e.g. eating)
- Client made substantial gains in scores on standardized ADL evaluations, and reported satisfaction with improvements in his ADL abilities





#### 1) NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE

"Tremor Fact Sheet", NINDS, Publication date July 2012. NIH Publication No. 12-4734.

Retrieved from

https://www.ninds.nih.gov/Disorders/Patient-Caregiver-Education/Fact-Sheets/Tremor-Fact-Sheet#3243\_6

#### RECOMMENDATIONS:

- No "magic bullet" or cure exists for most movement disorders
- Children often get symptom relief through various modalities including oral medications, Botox injections, an implanted baclofen pump, or deep brain stimulation



### RECOMMENDATIONS:

Tx should also include:

- Physiotherapy (exercise, strengthen and/or stretch the affected limbs and muscles) to limit the impact of the symptoms
- Occupational therapy to help children adapt their skills to overcome any limitations caused by abnormal movements
- Support to help the family and child cope with ongoing symptoms of movement disorders



### 2) ATAXIA UK

Bonney, H., de Silva, R., Giunti, P., Greenfield, J., & Hunt, B. (2016, July). Management of the ataxias towards best clinical practice, third edition.

Retrieved from <u>https://www.ataxia.org.uk/Handlers/Download.ashx</u> <u>?IDMF=df7928c8-4ae2-4174-8663-316d32c1eeff</u>

# RECOMMENDATIONS FOR PHYSIOTHERAPISTS\*:

For upper limb tremor:

- manipulation of visual information
- cold therapy
- wrist weighting (including weighted cutlery or writing implements)
- use of robotics

\*The evidence for these interventions is however preliminary and limited and therefore outcome measurement and monitoring is recommended

#### RECOMMENDATIONS FOR OCCUPATIONAL THERAPISTS\*:

 \*In the absence of specific research, this resource draws on "a philosophical approach, expert opinion and relevant progressive neurological conditions research"

# RECOMMENDATIONS FOR OCCUPATIONAL THERAPISTS:

- Compensation
- Adaptation
- Environmental modification strategies



- Adaptive software and technology
- Adaptive equipment
- Environmental modifications
- Supported positioning
- Client education



- 1) Supportive Seating:
- Trunk and pelvis well supported
- Use of a desk/tray (cut out)
- Feet should rest flat on the footplates/floor.

#### 2) Strength Training:

• Trial strengthening and resistive activities

3) Weighted Equipment: As appropriate, trial use of weighted pens, pencils, utensils and wrist weights

- 4) Adapted Equipment for functional tasks:
- Eating and mealtimes scoop plate, nonslip matting, weighted utensils, etc
- Self-care and toileting lever taps, zip-pulls, button hooks, Velcro, toilet rails, add-on bidet, etc
- Computer use trackball mouse, key guards, adjusted sensitivities, etc

5) Stabilization

Trial:

- Bracing or fixing the dominant arm against body or on table top when doing fine motor activities
- Grasping onto a desk or other surface with nondominant hand for added stabilization or use a positioning dowel or similar stabilizer



5) Stabilization Trial:

- Teaching of adapted movement patterns
  - e.g. sliding a hand across the table to reach a target versus reaching in space toward a target
  - e.g. break down patterns of movement from a continuous trajectory to a multi-step pattern
- Use of orthotics to stabilize selected joints



### KEY MESSAGES & CLINICAL BOTTOM LINE

- There is a lack of specific research evidence for treatment and management of upper limb ataxia in children
- All treatment interventions need to be monitored for effectiveness
- There is a great need for more research







#### FINE MOTOR



#### MANAGEMENT OF UPPER EXTREMITY ATAXIA IN CHILDREN WITH AQUIRED BRAIN INJURY

#### Did you know?

Approximately half of all brain tumors in children are in the cerebellum/brainstem; disturbances in the cerebellum/brainstem can cause ataxia (Snook, 2016). There is a lack of specific research evidence for treatment and management of upper extremity ataxia in children with acquired brain injury. Therefore, all recommendations should be monitored for effectiveness.

#### What are the best strategies for management of upper extremity ataxia?

In light of the lack of specific evidence for treatment of upper extremity ataxia, the following suggestions and recommendations for children and adolescents with acquired brain injury are based on clinical expertise as well as a clinical review article, a primary research article and health organization websites. These suggestions aim to assist in the management of upper extremity ataxia and to improve participation in meaningful activities. The focus should be on improving function with client chosen goals rather than addressing the underlying movement disorder.

- Supportive Seating: Provide seating to ensure the child is well supported in their chair/wheelchair with a desk/tray. A desk with a cut out may be useful. Feet should rest flat on the footplates/floor.
- Strength Training: Trial strengthening and resistive activities.
- Weighted Equipment: As appropriate, trial use of weighted pens, pencils, utensils and wrist weights.
- Stabilization: Increase postural stability and decrease multi-joint movements with the goal of improving functional performance. Trial:
  - Bracing or fixing the dominant arm against body or on table top when doing fine motor activities.
  - Grasping onto a desk or other surface with non-dominant hand for added stabilization or use a positioning dowel or similar stabilizer.
  - Teaching of adapted movement patterns



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Developed May 2018 by Barbara Ann Quirk & Ivonne Montgomery, Occupational Therapists, Sunny Hill Health Centrefor Children.

- e.g. sliding a hand across the table to reach a target versus reaching in space toward a target
- e.g. break down patterns of movement from a continuous trajectory to a multi-step pattern
- Use of orthotics to stabilize selected joints
- Adapted Equipment: Trial use of adaptations in functional tasks:
  - Eating and mealtimes scoop plate, nonslip matting, weighted utensils, etc.
  - Self-care and tolleting lever taps, zlp-pulls, button hooks, Velcro, tollet ralls, add-on bidet, etc.
  - Computer use trackball mouse, key guards, adjusted sensitivities, etc.

This resource has been developed by a team of occupational therapists at Sunny Hill Health Centre. The information included in this handout is based on current research and expert clinical opinion. Please contact your occupational therapist if you have any questions or concerns.

#### References

- Snook, A. G. (2016). Clinical Review, Ataxia in Children, CINAHL Information Systems, Rehabilitation Reference Center
- Tremor Fact Sheet. (2012, July). Retrieved from https://www.ninds.nih.gov/Disorders/Patient-Caregiver-Education/Fact-Sheets/Tremor-Fact-Sheet#3243\_6
- Gillen, G. Improving activities of daily living performance in an adult with ataxia. Am. J. Qccup, Ther. Off. Publ. Am. Qccup, Ther. Assoc. 54, 89–96 (2000).
- Bonney, H., de Silva, R., <u>Glupti</u>, P., Greenfield, J., & Hunt, B. (2016, July). Management of the ataxias towards best clinical practice, third edition. Retrieved from <u>https://www.ataxia.org.uk/Handlers/Download.ashx?IDMF=df7928c8-</u> 4ae2-4174-8663-316d32c1eeff



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#### Management of the ataxias towards best clinical practice

Third edition July 2016

Child Development & Rehabilitation

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	SHARE SHARE
Home	Brain Injury
Literature Resources	Evidence Diagnostic Information Conferences Web Resources/Links Family Resources
Learning Opportunities	Community Resources
Family Resources	
B.C Resources	Web Resources and Links
Discussion Forums	Sunny Hill Health Centre for Children in Vancouver, BC has resources related to this topic that may be helpful to
	clinicians and family members. Several of these links may only be accessible to the staff at this time. Please contact
Education & Development	the Service Coordinator if you would like to learn more but cannot access them. Additional national and internation sites have been included as Resources. This list is not meant to be comphrehensive.
lealth Conditions	
Seneral Healthcare	Sunny Hill Health Centre for Children and PHSA:
Rehab. Technology	
Research Sites	1. About Sunny Hill Health Centre for Children 2. Child Development and (Re)habilitation
	3. Sunny Hill Education Resource Centre (SHERC)
est Practice	4. Sunny Hill BI Intranet Resources (SHHC Staff only)
ating and Mobility	5. Sunny Hill Teamsites (SHHC Staff only) 6. SHHC ABI Resource Cupboard (SHHC Staff only)
	7. Concussion Awareness Tool for Parents, Players and Coaches
oorts & Fitness	
rofessional Resources	Canada:
	1. CanChild Centre for Childhood Disability Research
	2. Concussion Clinical Toolkit
	3. Evidence Based Practice Research Group at McMaster University
	4. Health Canada
	5. Think First - BI & SCI Prevention
	United States:
	1. COMBI-Brain Injury Outcome Measures
	<ol><li>Traumatic Brain Injury at National Institute of Neurological Disorders and Strokes</li></ol>
	3. University of Washington TBI Model System
	4. Assessing Outcomes in TBI
	5. Brain Injury Glossary 6. AMEDEO - The Medical Literature Guide
	7. NARIC's REHABDATA Literature Database
	8. Center for Neuroskills: TBI Resource
	9. National Resource Center for Traumatic Brain Injury
	International
	nice manonial.
	1. Physiotherapy Exercise Illustrations for Neurological Conditions
	2. CIRRIE Database of International Rehabilitation Research
	<ol> <li>University of Sydney Traumatic Brain Injury learning Modules</li> </ol>

#### REFERENCES

Bonney, H., de Silva, R., Giunti, P., Greenfield, J., & Hunt, B. (2016, July). Management of the ataxias towards best clinical practice, third edition. Retrieved from <u>https://www.ataxia.org.uk/Handlers/Download.ashx?IDMF=df792</u> <u>8c8-4ae2-4174-8663-316d32c1eeff</u>

- Gillen, G. Improving activities of daily living performance in an adult with ataxia. Am. J. Occup. Ther. Off. Publ. Am. Occup. Ther. Assoc. 54, 89–96 (2000).
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Tremor Fact Sheet. (July 2012). Retrieved from <u>https://www.ninds.nih.gov/Disorders/Patient-Caregiver-</u> <u>Education/Fact-Sheets/Tremor-Fact-Sheet#3243\_6</u>