GENERAL EXERCISE RECOMMENDATIONS FOR PEOPLE LIVING WITH ATAXIA

Julie Walker PT, DPT, NCS
Please consult with your primary care provider, neurologist, or other health care provider about any advice, exercise, therapies, medication, treatment, nutritional supplement, or regimen that may have been mentioned as part of any presentation.
OBJECTIVES

- By the end of the session the learner should be able to:
  - Discuss common challenges to function
  - Discuss the benefits of exercise
  - Identify current literature
  - Identify available PT resources
WHAT IS THE ROLE OF THE CEREBELLUM?

Center for **Balance, Coordination, and Learning**

Controls all Motor behavior

- Limb Movements
- Trunk Movements
- Eye Movements
- Speech
ATAXIA SYMPTOMS

- Impaired Coordination
  - Difficulty with reaching for objects or writing

- Decreased balance
  - Impairments with postural adjustments and control of balance

- Difficulty Walking
  - Varied step placement due to trouble with leg coordination

- Trouble controlling eye movements

- Slurring of speech

- NO WEAKNESS
  - Feel “weak” due to impaired motor control
BALANCE SYSTEMS

Vision

Somatosensory

Vestibular
WHAT ABOUT WALKING?

Decreased Coordination in Legs and Trunk
+
Impaired Balance
=
Variability of steps
Increased Falls
Fatigue
WHAT IS A BETTER PREDICTOR OF IMPROVED QUALITY OF WALKING?

☐ A: Leg Placement (coordination)

☐ B: Balance

Answer: Balance (Morton and Bastian 2003)
Walking Speed (m/s)

Walking Speed (m/s) Predicted by Balance and Leg Placement Deficits

(Morton and Bastian 2003)
AMERICAN COLLEGE OF SPORTS MEDICINE
EXERCISE RECOMMENDATIONS
ACSM: AEROBIC EXERCISE

- **Frequency:** >5 days a week of moderate exercise, or >3 days a week of vigorous exercise
- **Intensity:** Moderate and/or Vigorous Intensity
- **Duration:** 30-60 minutes a day, total 150 minutes a week of purposeful moderate exercise
- **Mode:** Regular, purposeful exercise that involves major muscle groups and is continuous and rhythmic in nature

Exercise may be performed in one continuous session per day or in multiple sessions of more than 10 minutes to accumulate the desired duration and volume of exercise per day.
ACSM: RESISTANCE EXERCISE

- **Frequency**: Each major muscle group should be trained 2-3 days a week
- **Intensity**: 60-70% of the 1 repetition max
- **Repetitions**: 8-12 repetitions
- **Sets**: 2-4 sets to improve strength and power
- **Rest**: Rest >48 hours between sessions for any single muscle group

- Decrease intensity and increase repetitions to improve muscular endurance
ACSM: FLEXIBILITY EX

- **Frequency**: >2-3 days a week
- **Intensity**: Stretch to the point of feeling tightness or slight discomfort
- **Duration**: Hold a static stretch for 30-60 seconds
- **Mode**: Series of flexibility exercises for each of the major muscle-tendon units

- Flexibility exercise is most effective when the muscle is warmed through light to moderate aerobic activity or passively through external methods such as moist heat packs.
ACSM: NEUROMOTOR EXERCISE

- **Frequency**: >2-3 days a week
- **Intensity**: Unknown
- **Duration**: >20-30 minutes per day
- **Mode**: balance, agility, coordination, gait

Methods for optimal progression are not known
EVIDENCE IN THE LITERATURE

- Why is Exercise so Important?
- What can it help me be able to do?
- How can I start exercising and what should I do for exercise?
CAN EXERCISE SLOW DISEASE PROGRESSION?

Exercise may help regain functional performance of one or more years of the disease progression (miyai, ilg)

- SARA scores may worsen 0.4 to 2.2 points per year depending on type of ataxia (Jacobi 2011)

- Intensive Coordination Therapy studies have shown SARA Scores improve up to 5.2 points = Gaining 2 or More YEARS of disease progression (Miyai, Ilg 2009)
WHAT ARE YOUR GOALS?

Infrequent Faller
- Improve Dynamic balance
- Decrease falls risk
- Prevent need for an assistive device
- Playing sports etc.

Frequent Faller
- Improve task specific skills
- Transfer training
- Improve Static Balance
- Decrease Falls

Set and establish goals with help of a Physical Therapist
EXAMPLES OF GOALS:

Infrequent Faller

- Talk to family while walking
- Walk and carry something without spilling it
- Negotiate a curb safely
- Be able to play catch with my son

Frequent Faller

- Be able to transfer from the bed to a chair without help
- Stand in the kitchen and talk to family without having to hold onto the counter
- Use the regular chair at a restaurant instead of my wheelchair
BENEFITS OF BALANCE TRAINING

- Improved Quality of Walking
  - Decreased Variability of steps
  - Decreased Variability of sway
  - Improved Walking Speed
- Reduces Risk of Falls
- Improves Motor Planning

Ilg 2009, 2015; Bastian and Keller 2014
INTENSIVE COORDINATIVE TRAINING IMPROVES MOTOR PERFORMANCE IN DEGENERATIVE CEREBELLAR DISEASE
ILG ET AL. 2009

- **Patients**
  - 16 patients
  - 10 with Cerebellar Ataxia
  - 6 with Sensory Ataxia

- **Intervention**
  - 4 weeks of Intensive therapy with a therapist
  - 3x a week for 1 hour sessions

- **Results**
  - Decline of average of 5.2 points on SARA
  - Increased Gait Speed
  - Less Variability of step placement

All equal less risk for falls!
WHAT DID THEY DO FOR EXERCISE?

Static Balance Exercises
- Standing with varied feet position
- Sitting on varied surfaces

Dynamic Balance Exercises
- Kneeling with arm movement
- Stepping while standing
- Climbing stairs
- Side stepping
- Walking on uneven ground
EXERCISES TO PREVENT FALLS

- Stepping in multiple directions
- External perturbations by the therapist while standing or moving
- Quadruped (on all 4s) and practice of floor transfers
- Squatting and standing back up
6 WEEK HOME EXERCISE STUDY FOR PEOPLE WITH CEREBELLAR DAMAGE (KELLER, BASTIAN 2014)

- **Patients**
  - 14 patients with cerebellar ataxia

- **Assessments**
  - Walking speed
  - Walking balance tests

- **Intervention**
  - Home Physical Therapy
SITTING BALANCE EXERCISES

Movement on Varied Support Surfaces

Adapted from Jennifer Keller
STANDING BALANCE EXERCISES

Weight shifts—all directions, stable surface, eyes closed, foam.

Changing base of support, stable surface, eyes closed, foam.

Stepping on steps, stable surface, foam.

Adapted from Jennifer Keller
Tests that were not directly part of the training improved!

Adapted from Jennifer Keller
WHAT WAS THE KEY TO IMPROVEMENT?

Participants who rated the exercises as more challenging improved the most (Bastian Keller 2014)
WHAT IS THE KEY FOR EXERCISE?

- Exercise needs to be **CHALLENGING** enough to be beneficial
  - Periodically review your home program with your PT

- Exercise needs to be **SAFE** to prevent falls
  - Exercise with advice from a Neuro PT

- Motor Learning is achieved with **REPETITION** and reinforcement  
  (Therrian 2016)
HOW DO YOU FIND A NEURO PT??

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Questions?
SPECIAL THANKS TO:

- Jennifer Keller
- Jennifer Millar
- Amy Bastian
- The Johns Hopkins Ataxia Clinic


