

GENERAL EXERCISE RECOMMENDATIONS FOR PEOPLE LIVING WITH ATAXIA



JOHNS HOPKINS
M E D I C I N E

**PHYSICAL MEDICINE
AND REHABILITATION**

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DISCLAIMER

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

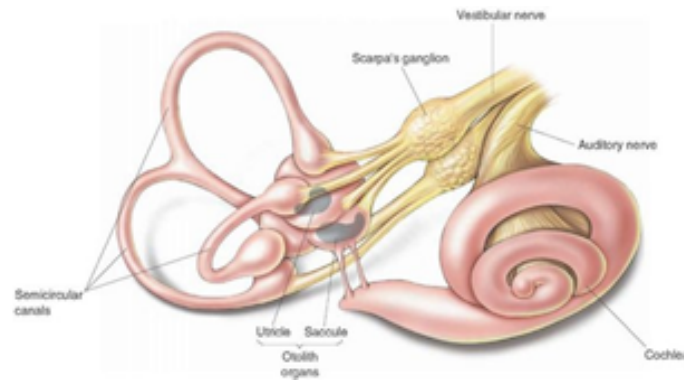
BALANCE SYSTEMS



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?

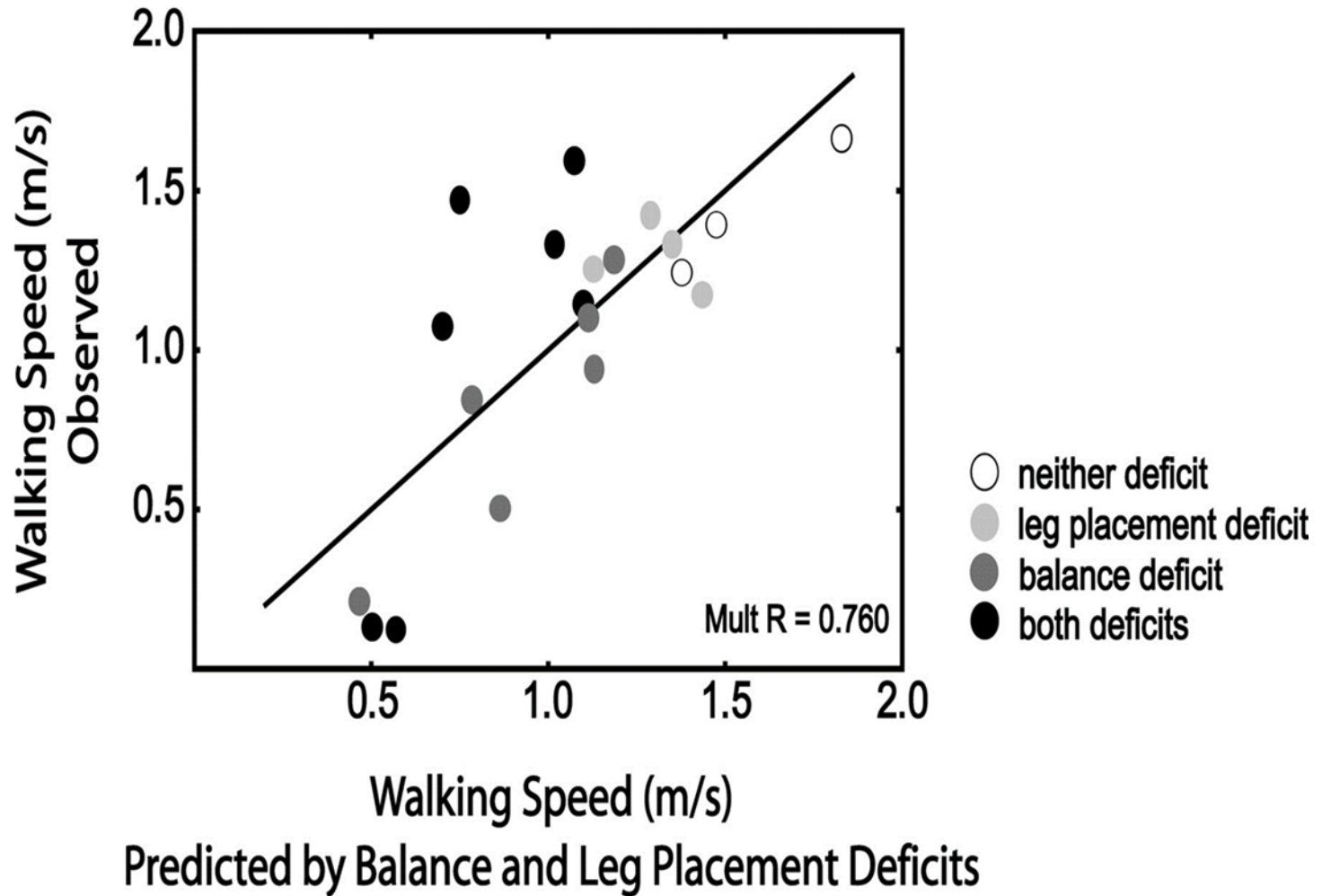
A: Leg Placement (coordination)

Answer:

Balance

(Morton and Bastian 2003)

B: Balance



(Morton and Bastian 2003)

AMERICAN COLLEGE OF SPORTS MEDICINE EXERCISE RECOMMENDATIONS



ACSM: AEROBIC EXE



- ❑ 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 E



- ❑ 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?



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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

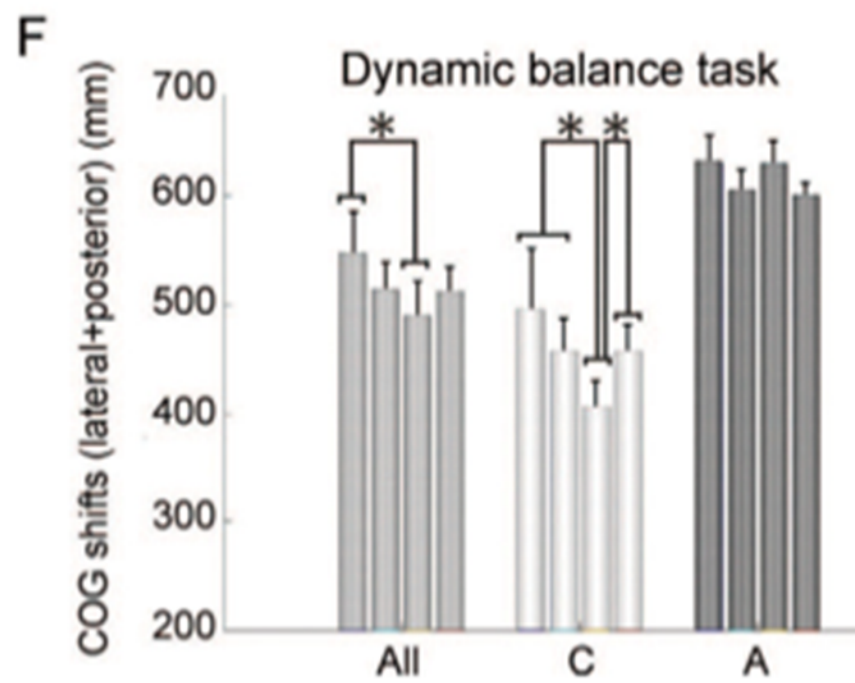
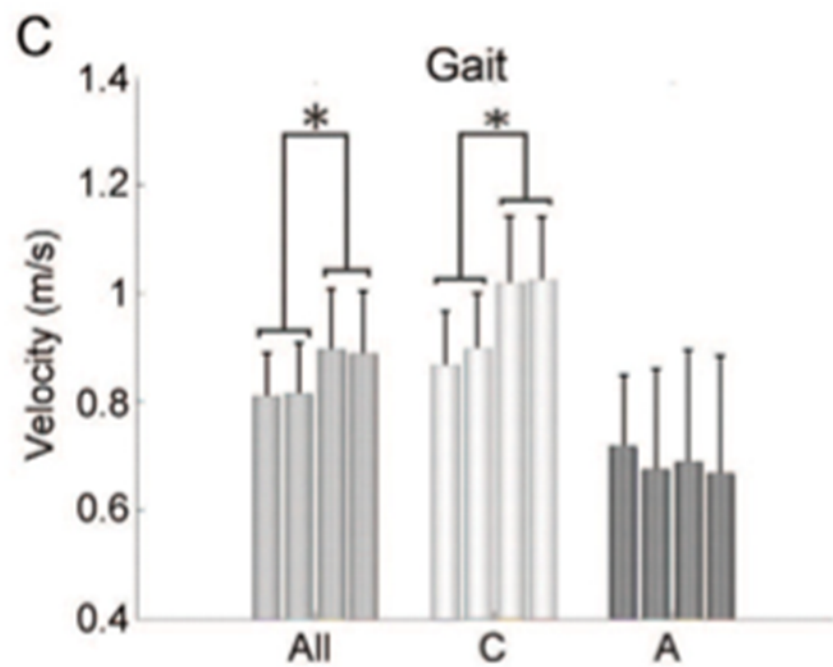
□ Intervention

- 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

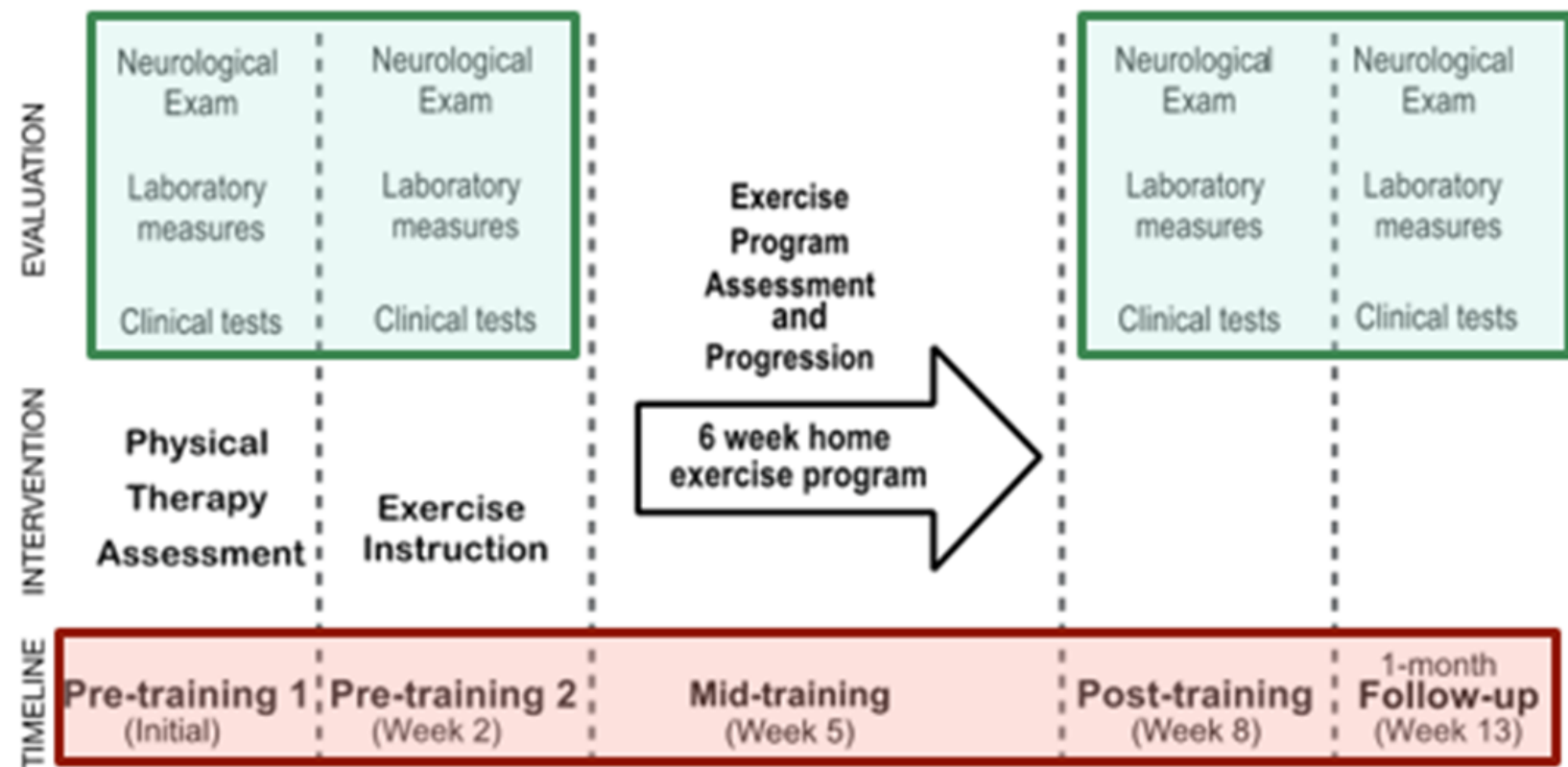
- 14 patients with cerebellar ataxia

□ Assessments

- Walking speed
- Walking balance tests

□ Intervention

- Home Physical Therapy



SITTING BALANCE EXERCISES

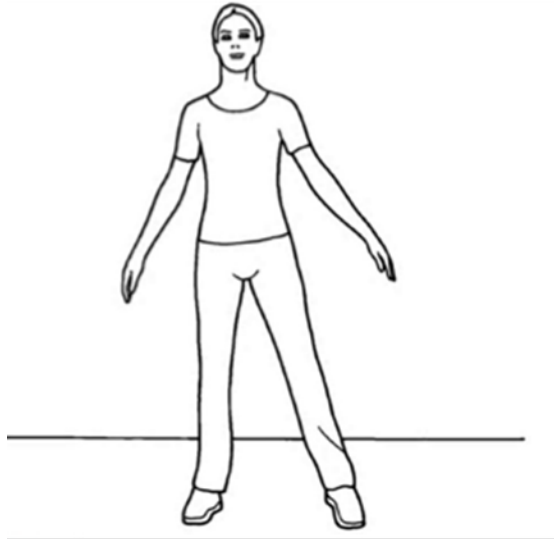


Movement on Varied Support Surfaces



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.

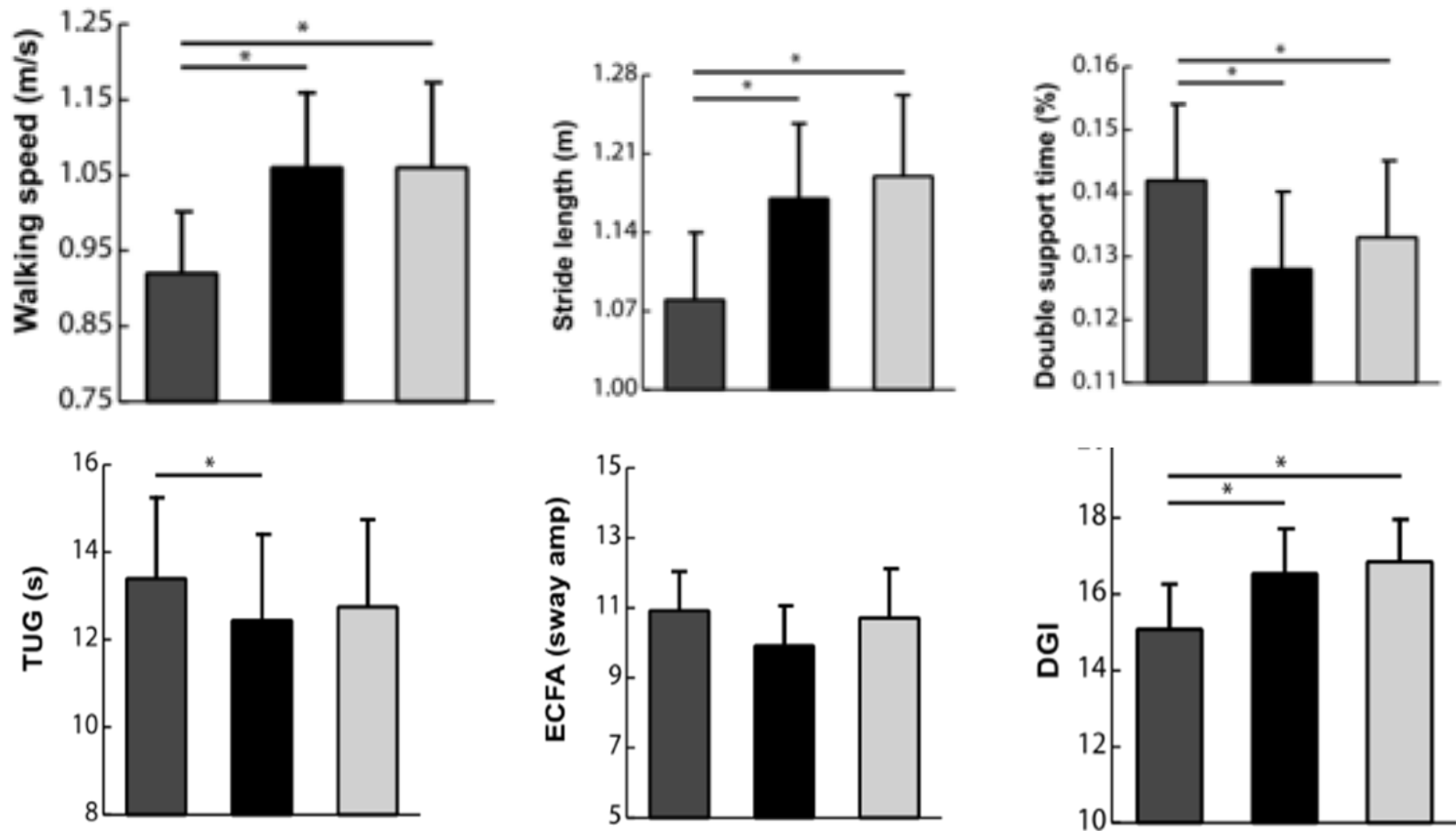


Stepping on steps
stable surface,
foam.

Adapted from Jennifer Keller

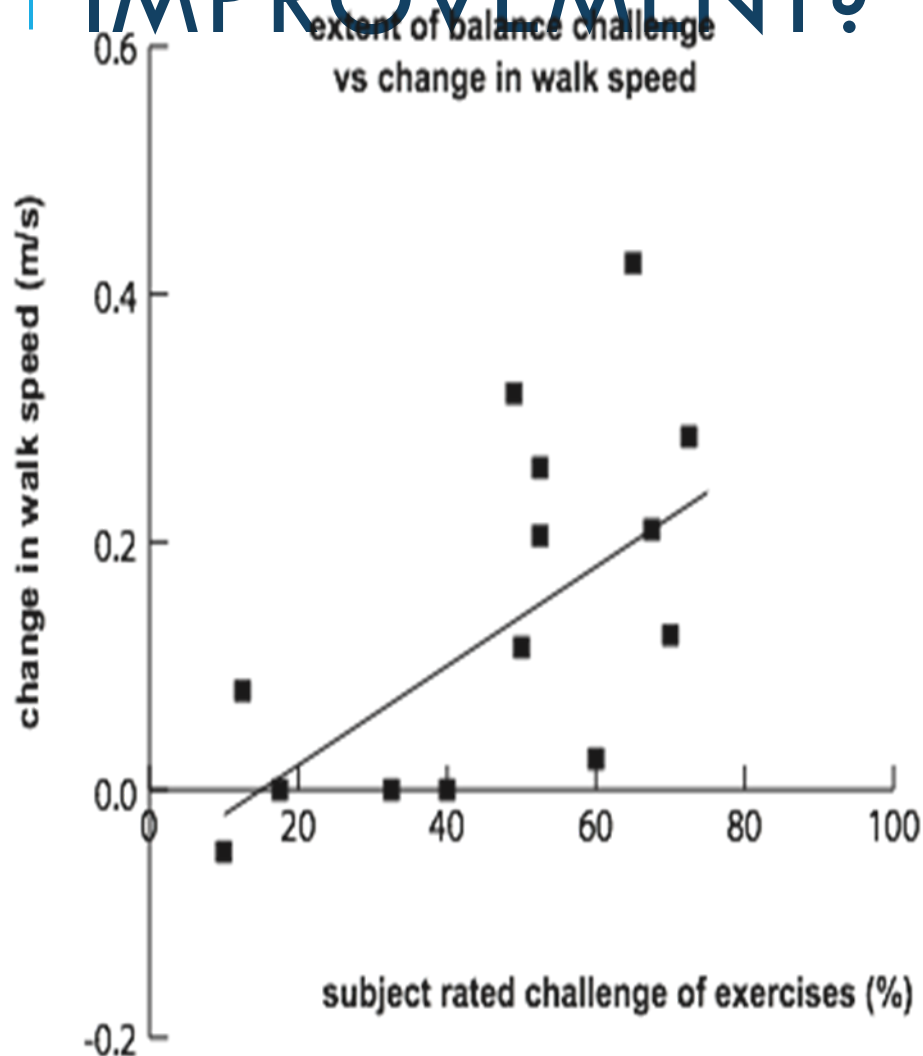
RESULTS

Tests that were not directly part of the training improved!



Adapted from Jennifer Keller
Pre-training Post-training Follow-up

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)

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Questions?



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