Ataxia and Effect of Exercise

Frank X & Christian L
Overview

- Background
- Symptoms
- Cause/risk factors
- Treatment/assessment
- Effects of exercise
- Types of training/exercises
- Nutrition
- Questions
Background

* Literally, ‘disorderly’
* Lack of voluntary coordination of muscle movements
* Non-specific clinical manifestation implying dysfunction of parts of the nervous system that coordinate movement, such as cerebellum.
* Dystaxia is a mild degree of ataxia
Symptoms

* Deficiencies in
  * postural control/balance
  * multi-joint skeletal muscle movement
* Muscle strength unaffected
* Multiple types and causes
Symptoms

- Can present as dysfunction in
  - Conscious movement
  - Coordination
  - Gait
    - Typically wide-set to compensate for balance
  - Start & stop movement
  - Eye coordination
  - Tremor (intention, postural)
  - Dyssynergia (uncontrolled motor movement)
  - Dysdiadochokinesia (rapid alternating movements)
  - Poor fine motor skills
  - Can affect speech/swallowing
Types

* Cerebellar
  * Dysfunction of the vestibulocerebellum
  * Dysfunction of the spinocerebellum
  * Dysfunction of the cerebrocerebellum
* Sensory
* Vestibular
* Frontal
* Mixed
Causes/Risk Factors

* Commonly:
  * Focal Lesions (stroke, tumor, MS)
  * Genetics

* Less commonly:
  * Radiation poisoning
  * Vitamin B12 deficiency
Traditionally multimodal
Physical and mental exercise
Neurologist consultation
Pharmacological
  * Often not a primary recourse!
  * Effectiveness at preventing or stopping ataxia is limited
  * Effective treatment for specific deficiency ataxias (ex. vitamin E)
  * Some medications effective at reducing tremors
Assessment tests

* Walking!
* Static balance tests
  * Perturbation tests (push & pull)
  * Single leg stand
* Dynamic balance
  * Sit to stand
  * Timed up & go
  * Four square step
* Gait
  * Timed up & go
  * Sit to stand
Exercise focus

* Improving balance and postural reactions
* Increase postural stabilization
  * Stabilize joints
* Developing upper extremity functions
* Increase functional independence (i.e. daily activities)
Exercise focus

- Exercises should progress from simple to complex
- Activities should be practiced first with the eyes open and later with the eyes closed
- Proximal stability should be achieved before distal stability
- Supportive aids should be employed when necessary
- Home exercise and sports should be employed
Exercise and physical therapy can be effective in helping sustain mobility as the disease of ataxia progresses.

Program developed by National Ataxia Foundation
Coordination and mobility of spine and shoulders

* **Rotation in lying**
* Lie down on your back
* Bend your knees and put your feet on the mat
* Spread your arms
* Tilt both knees to one side
* Move knees back up
* Repeat the same procedure to the other side
* Repeat 10 times to each side
Coordination and mobility of spine and shoulders

- Rolling on a mat or in bed
- Lie down on your back
- Lift the arm in the direction you want to roll
- Push the other arm over your body and lift the leg, so that you come to lay on your side
- Roll back
- Repeat 10 times to each side
- Variation: roll from your back - to side - to stomach - to side - to back in a continuing manner
Coordination and balance

* **Shifting your weight to the side**
  * Sit upright
  * Shift your weight to the right
  * Sit back up
  * Repeat 5 times
  * Shift your weight to the left
  * Sit back up
  * Repeat 5 times

* **Increase of Difficulty:**
  * 1. Put one foot on the bed and back on the ground
  * 2. Put both feet on the bed over the side
**Standing Up from the Ground Using Bear Stand**

- Stand – bend knees and spine
- Touch the floor
- You will be in quadruped position
- Stand on your feet with your hands still on the ground
- Straighten your knees, but keep them slightly bent; pressure remains mostly on the forefoot
- Lift your hands off the ground, stand up, and orient your weight forwards; keep your knees slightly bent
Dynamic Balance Training / Safety Steps

* **Side Steps**
  * Stand upright with your feet hip-width apart
  * Take a big step to the side
  * Go back to the original position
  * Repeat 20 times with each leg

* **Steps forwards**
  * Stand upright with your feet hip-width apart
  * Take a big step forwards
  * Go back to the original position
  * Repeat 20 times with each leg
Training of Hand-Arm Coordination

- **Throwing and Catching a Ball**
  - Throw the ball up in the air with your right hand and catch it with your right hand
  - Do the same with your left hand
  - Throw as far up as your eye height
  - Catch at the height of your waist
  - Throw a ball from the right hand to the left and back
Training of Hand-Arm Coordination

* Drinking
  * Keep calm
  * Move one hand to your chin – and back to the table - repeat 10 times
  * Pour water into a big cup
  * Take the cup and move it to your chin and back to the table – 10 repetitions
  * Drink two mouthfuls – put the cup back on the table
  * Do 7 repetitions
  * Motto: Shoulder Relaxed
Frenkel Exercises

* Developed for cerebellar ataxia
* **Very high** repetitions and frequency
* Patient must observe themselves moving
OFITT

* Coordinative exercises
  * 7 – 13 exercises per session
  * 30 minute sessions
  * 2 sessions per day
  * 7 days per week

* Frenkel exercises
  * 20,000 – 30,000 repetitions!
  * Recommended 60 reps/hour/day for 6 weeks
Dietary Recommendations for Ataxia

- Avoid:
  - Freshly baked breads
  - Dark/milk chocolate
  - Citrus foods
  - MSG
  - Nitrates, sulfites, tyramine
  - Raw onions
Dietary Recommendations for Ataxia

* Increase:
  * Vitamins (B12, C, D, E, K)
  * Minerals (calcium, magnesium)
  * Omega 3s
  * Flavonoids
Stem cell therapy
Questions

- What is ataxia?
- What are Frenkel exercises?
- What is the goal of physical therapy in ataxic patients?