

Outline of Talk

- Role of Physical Therapy in care of people with Huntington Disease
- Standard assessment tool for balance
- Fall Prevention
- Benefits of exercise
- Overcoming barriers to exercise in pHD
(person with Huntington's Disease)

Introduction

- Huntington's Disease causes physical and mental symptoms that lead to
 - Progressive loss of functional abilities
 - Difficulties with activities of daily living
 - Balance and walking problems
 - Fall related injuries
 - Low physical activities and fitness
- As these problems worsen over time, they
 - Increase fall risk
 - Reduce quality of life

Common cause of falls in HD

- Decline in muscle control in arms and legs
- Disturbed gait, walking path veered
- Poor posture
- Impaired coordination
- Decrease equilibrium
- Slower recovery response
- Impaired vision
- Dizziness
- Side effects of medications



Falls

- Falls typically start to occur in the Middle stage of HD
- Often occur when person is
 - Multi tasking
 - Turning quickly
 - Stepping over an obstacle on floor
 - Wearing unsupportive footwear, eg high heels, flip-flops or worn footwear

Goals of Physical Therapy

- Promote quality of life and independence by encouraging activities and maximizing functional mobility e.g. bed mobility, transfers from sit to and from stand, sitting, standing, walking
- Promote safety and prevent falls

Study on Falls and Stumbles

- Data were collected for falls and stumbles in the previous 12 months using a questionnaire
- Participants were categorized as recurrent fallers if they reported >2 falls over the previous 12 months
- If patients reported <1 fall, they were not considered to be recurrent fallers.



Falls Data Analysis

- **20.8%** reported **no falls** in previous 12 months
- 20.8% reported only one fall
- 58.3% reported falling twice or more (classified as recurrent fallers)
- This study confirms that people with manifest HD do fall regularly, only **20.8%** of people did not report any falls in previous 12 months

Outcome measures for falls

Studies showed that fallers took fewer steps and walked more slowly than non-fallers.

Tests to predict probability of falling:-

- TUG (Timed Up and Go) test
- BBS (Berg Balance Scale)

Berg Balance Scale

- 1. Sitting unsupported _____
- 2. Change of position: sitting to standing _____
- 3. Change of position: standing to sitting _____
- 4. Transfers _____
- 5. Standing unsupported _____
- 6. Standing with eyes closed _____
- 7. Standing with feet together _____
- 8. Tandem standing _____
- 9. Standing on one leg _____
- 10. Turning trunk (feet fixed) _____
- 11. Retrieving objects from floor _____
- 12. Turning 360 degrees _____
- 13. Stool stepping _____
- 14. Reaching forward while standing _____
- TOTAL (0–56): _____

- <https://www.youtube.com/watch?v=NX2LD5G3BFo>

Berg Balance Scale

- 14-item scale designed to measure balance of the client in a clinical setting.
- Scoring: A five-point scale, ranging from 0-4.
- “0” indicates the lowest level of function and
- “4” the highest level of function. **Total Score = 56**
- **Interpretation:** 41-56 = low fall risk/ independent
- 21-40 = medium fall risk/ walking with assistance
- 0 –20 = high fall risk/ Wheelchair bound
- A change of 8 points is required to reveal a genuine change in function between 2 assessments.

Falls: Balance assessment

- **Berg Balance Scale (BBS)**
- Maximum score 56 indicating good balance
- Cutoff: **<40 is at risk for falls**

Falls: Balance assessment

- **Timed Up and Go (TUG) Test**
- Simple test used to assess a person's mobility
- Requires both static and dynamic balance
- Measures the time that a person takes to rise from a chair, walk 3 meters/ 10 feet, turn around, walk back to the chair and sit down.
- Cutoff: **>14 seconds indicates fall risks**
- <https://www.youtube.com/watch?v=grrYoBucNPE>

Timed Up and Go Instructions

- 1. Equipment: arm chair, tape measure, tape, stop watch.
- 2. Begin the test with the subject sitting
- 3. Place a piece of tape or other marker on the floor 3 meters away from the chair
- 4. Instructions: “On the word GO you will stand up, walk to the line on the floor, turn around and walk back to the chair and sit down. Walk at your regular pace.
- 5. Start timing on the word “GO” and stop timing when the subject is seated again correctly in the chair with their back resting on the back of the chair.

TUG test interpretation

- Cut-off Values Predictive of Falls by time in Seconds
- > 14 associated with high fall risk
- > 24 predictive of falls within 6 months
- > 30 predictive of requiring assistive device for ambulation and being dependent in ADLs

Falls: Balance assessment

- Study confirms that people with manifest HD do fall regularly. Only 20.8 % of people did not report any falls in the previous 12 months.
- Fallers took fewer steps and walked more slowly than non-fallers, their TUG and BBS scores were worse.
- Recurrent fallers were less active than non-fallers and less independent

Falls: Balance assessment

- The TUG and BBS scores both predicted probability of falling and may therefore be considered for use in people with HD
- TUG test needs a clear understanding of the instructions as well as an interaction between patient, assessor and environmental setting
- BBS may reveal more in those with cognitive impairment

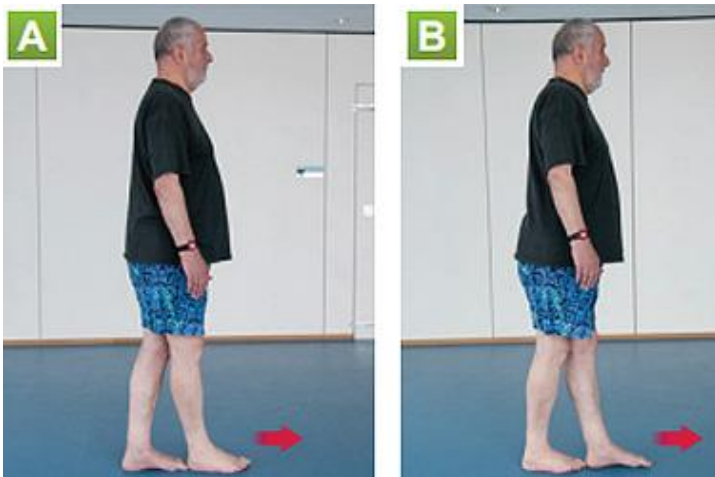
Fall Prevention: Balance Training

- Person needs to practice tasks that are challenging and performed under various practice (eyes open or closed) and environmental conditions (firm surface, foam)

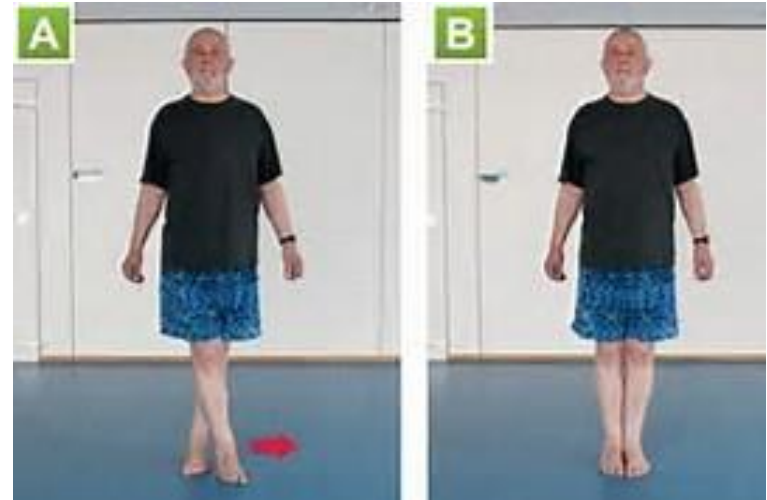


Fall Prevention: Balance Training

Tandem Walk



Grapevine walk



Fall Prevention: Balance Training

- Synchronizing walking to beats of a metronome (but not music) improved gait speed in people with HD



Fall Prevention: Stairs

- Stop before using stairs
- Slow down when descending the stairs
- Use handrails
- Avoid doing other things such as carrying the laundry or talking to someone



Fall Prevention: Environmental Modifications

- Safety awareness
- Reduce clutter, slippery surfaces, loose rugs, poor lighting, sharp or breakable objects
- Install rails on stairs, grab bars in bathrooms and use shower seat



Preventive Techniques for Falls

- Protective gear includes
 - Soft helmets
 - Knee pads
 - Elbow pads
 - Hip protector pads



Fall Prevention: Seating

- Wheelchair with drop seat height allows person to plant feet firmly on ground
- Anti-tips prevents chair to tip back
- Reclining WC



- Broda chair



- Transport chair



Fall recovery

https://www.youtube.com/watch?v=Snb_1xZi5v0



Exercise is NEUROPROTECTIVE

- Brain training improves cognitive performance and survival in transgenic mouse model of Huntington's Disease
- Mice with HD, placed within an environment providing **physical, mental and social stimulation**, have a delayed onset of symptoms and maintain motor function for longer.



Benefits of Exercise in HD

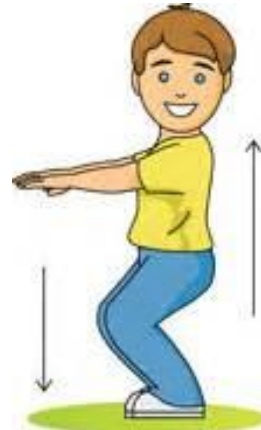
- Many studies show that PT improves **strength, balance, walking and quality of life**
- Since 2007, at least 9 small scale feasibility studies have supported exercise in people with HD (a progressive neurological disease that includes cognitive, behavioral and motor symptoms)

Benefits of Exercise in HD

- Exercise has been shown to improve functional capacity in neurological disease
- Studies of mouse models of HD found exercise delayed the onset of HD symptoms, improved cognition and raised the levels of BDNF (Brain Derived Neurotrophic Factor) - a chemical that helps to protect the brain

Benefits of Exercises in HD

- One case study of patient with HD found that a 7-week program of twice-weekly aerobic and anaerobic exercises resulted in greater strength, improved balance and fewer falls



Workout components of exercise

- Should address the person's abilities, likes and functional challenges
- Ideal workout involves
 - A warm up and cool down
 - Tai chi, yoga, free weights or pulleys to develop muscular strength, to improve balance and functional skills
- Cardiovascular session such as walking, using an exercise bike or working out in the pool

Cardiovascular exercises

- Walking – done on a track, around the block or around the mall.
- Start with 10 minutes a day, 3 days a week.
- Start off slowly, choosing a comfortable resistance and gradually pick up the pace
- ACSM(American College of Sports Medicine) ex guidelines, 30 mins, 3 days a week at moderate intensity {~70% age predicted maximal Heart Rate (220-age)}

Walking Program with Pedometers

- Under 5000 steps per day used to indicate “sedentary lifestyle”
- 10,000 steps per day indicates the point that would classify someone as active.



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Exercise guidelines

- Common areas of weakness in HD:
 - Neck extensors
 - Postural muscles of the trunk
 - Muscles of the hands and feet



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Core strengthening exercises



**KNEES UP
CRUNCH**



CRISSCROSS



CRUNCH



LEGS LOWER



HEEL TOUCH

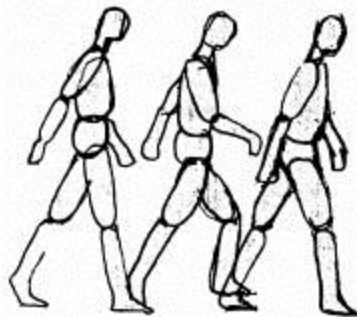


FLUTTER KICKS

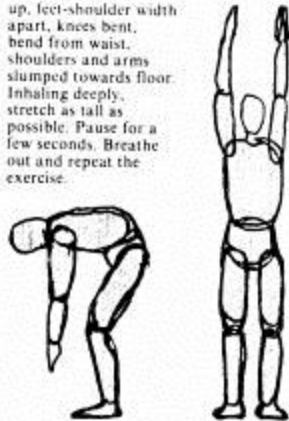


There are many exercises available to help to increase your circulation, muscular relaxation and reduce fatigue. Here are some examples but this list is by no means complete. For exercise routines designed for your specific workplace please consult your health service, ergonomic consultant or the service listed on the back page of this pamphlet.

- 1** Get up from chair, walk a distance of at least several metres briskly

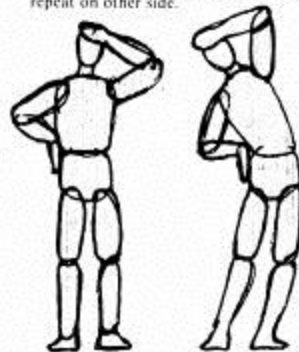


- 2** **BODY ROLLS** Stand up, feet-shoulder width apart, knees bent, bend from waist, shoulders and arms slumped towards floor. Inhaling deeply, stretch as tall as possible. Pause for a few seconds. Breathe out and repeat the exercise.



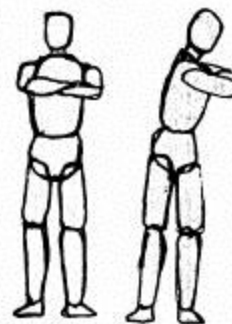
- Hints for exercises**
- 1 Breathe regularly and normally, **DON'T HOLD YOUR BREATH.**
 - 2 Don't hurry, always stretch slowly and carefully.

- 3** **SIDE-STRETCHES** Stand up, feet-shoulder width apart, left hand on waist, right hand on top of head, palm facing forward. Stretch to left side sideways NOT forward. Pause 10 seconds and repeat on other side.

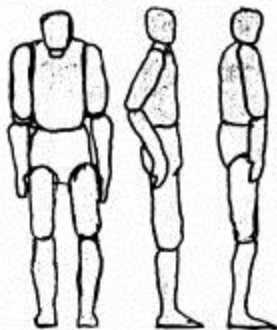


- 3 Repeat each exercise 3 to 5 times.
- 4 If an exercise hurts, stop and go on to something else.
- 5 Enjoy them.

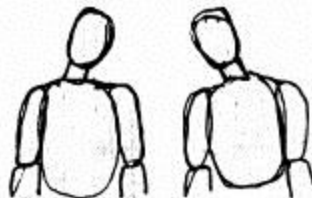
- 4** **TRUNK TWISTS** Stand up, feet-shoulder width apart, arms folded in front, elbows shoulder height and slowly twist upper body to left, keep hips forward and still. Pause 10 seconds and repeat on other side.



- 5** **SHOULDER ROLLS** Stand up. Keep arms relaxed and by side. Rotate shoulders in as full a range of motion as possible up, back, forwards.



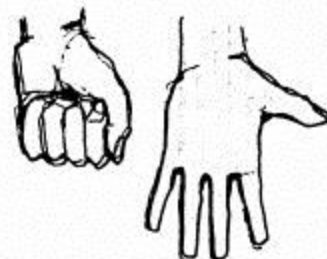
- 6** **NECK STRETCH** Sit correctly, hands relaxed on lap, keep shoulders relaxed, incline ear to left shoulder and straighten head. Pause 10 seconds and repeat on other side.



- 7** **CHIN TUCKS** Sit correctly, hands relaxed on lap, tuck chin well in, head forward and move chin from left to right as far as possible with chin touching chest.



- 8** **FINGER STRETCHES** Stand up, feet-shoulder width apart, relaxed at side, clench fists tightly and hold 3 seconds. Stretch fingers as widely as possible and hold 3 seconds. Now repeat.



Exercise Bike

- Start out with 10 minutes of stationary bike
3x a week
- Start off slowly
- Choose a comfortable resistance and gradually pick up the pace



Frequency and Duration of exercise

- Strength training should be performed a minimum of 2-3 days each week with 8-12 reps of different exercises that target all major muscle groups.
- Shorter, more frequent exercise sessions may be less tiring

Intensity of Workouts

- Person with HD should be exercising at a level around **13 (somewhat hard)** on the **Borg RPE** (Rating of Perceived Exertion) scale
- 6 is very, very light and 20 is very, very hard
- Watch for symptoms of over exertion:
 - Short of breath
 - Excessive fatigue
 - Paleness
 - Dizziness
 - Increase in HD symptoms eg involuntary movements

Échelle de Borg

Borg's Scale

très très facile

6

very, very light

7

très facile

8

very light

9

assez facile

10

fairly light

11

un peu difficile

12

somewhat hard

13

14

difficile

15

hard

très difficile

16

very hard

17

18

très très difficile

19

very, very hard

20



Barriers to Exercise in HD

- HD symptoms (depression, apathy, movement problems)
- Lack of interest
- Fear of falling
- Low outcomes expectations
- Transportation problems
- Time conflicts

Motivation to Exercise

- Find an exercise partner
- Perform tasks that involve physical activities
 - Walking to the mailbox and back
 - Cleaning
 - Gardening
 - Shopping
 - Walk the dog
- Positive feedback/ rewards

Summary

- Animal and human studies support the benefit of exercise in individuals with HD
- Physical Therapists use many different treatments to improve balance and mobility in people with HD
 - Balance training
 - Gait training
 - Auditory, visual and cognitive cues
 - Functional training

Three vertical bars on the left side of the slide: a thick orange bar, a thin black bar, and a thin light blue bar.

Thank you for your attention!



Any questions?!

