How to reduce your risk of falls and injury while living with Parkinson disease

August 8th, 2020
Claire McLean PT, DPT, NCS

1

What I want to talk about today

- Falls
- How to get inspired by others!
- Parkinson's Specific Info
- What you can do for yourself!

2

Action Item #1: Learn!

3

Falls

- They can happen to anyone!

- Stats: 1/3 of adults over 65 have a fall each year
- 87 % of all fractures in older adults are due to falls
- Many falls do not result in injuries, yet 47% of non-injured seniors who fall cannot get up without assistance

National Council on Aging (NCOA). "Falls Prevention Facts." Web. 2015.
Mayo Clinic. "Fall Prevention: Simple Tips to Prevent Falls". Web. 2014.
Learn Not to Fall. "How Often Falls Occur". Web. 2012.

4

PD Specific Fall Stats

- In a review including 22 research studies, 60.5% of PWP (up to 90%) experienced at least one fall, with 39% (up to 65%) reporting recurrent falls.
- Recurrent fallers reported an average of 4.7 to 67.6 falls per person per year.

Review Article

Recurrent Falls in Parkinson's Disease: A Systematic Review

Natalie E. Allen, Allison K. Schwarzel, and Colleen G. Canning

5

Factors associated with recurrent falls

- Fall history
- Increased disease severity and duration
- Increased motor impairment
- Treatment with dopamine agonists
- Increased medication dosage
- Cognitive impairment
- Fear of falling
- Freezing of Gait
- Reduced physical activity

Review Article

Recurrent Falls in Parkinson's Disease: A Systematic Review

Natalie E. Allen, Allison K. Schwarzel, and Colleen G. Canning

6

J Neurol. 2001 Nov;248(11):950-8.

Prospective assessment of falls in Parkinson's disease.

Bloem BR[1], Grimbergen YA, Cramer M, Willemsen M, Zwinderman AH.

- 70% of falls reported by PWP were "intrinsic" (due to patient-related factors) vs falls in controls were mainly (50%) "extrinsic" (due to environmental factors).
- Recurrent falls were reported by 36.8% of PWP using benzodiazepines, and by 10.5% of PWP not using benzodiazepines.
- Benzodiazepines: Diazepam (Valium), Corazepate (Tranxene), Oxazepam (Serax), Lorazepam (Ativan), Alprazolam (Xanax), Clonazepam (Klonopin) and others!
- "Strategies to prevent falls in PD should particularly focus at intrinsic factors, such as minimizing the use of benzodiazepines."

7

Action Item #2: Talk to your Neurologist, Primary Care Physician about your medications

Especially, are you on a benzodiazepine?

8

Action Item #3: Be Inspired!

10

A story that started with a fall…

11

72 years old, 10 years post PD dx, continues to improve

12

The floor and the "WHY"

13

7 years later – less freezing and better walking overall!

14

15 years after PD diagnosis – Amazing Athlete
Reduced medication (by 30%) after starting exercise

15

Postural improvement with exercise

16

Colleen

- Dx 2012
- 67 years old (in 2019)

Improved function in assessments over the course of 1.5 years

- Cognition/Processing Speed (Trail making test)
- Single Limb Balance (2 minutes on right, 5 minutes on left)
- Functional Strength (30 second chair stand test)
- Balance/Fall Risk (TUG)
- Walking velocity
- Walking endurance
- Fine motor Dexterity
- Grip Strength

17

~~Action Item #3: Be Inspired!~~

18

Action Item #4 Ask yourself:

- Have I had a fall, or am I worried about falling?
- Do you notice a change in your balance?
- Do you notice a change in your memory or thinking?
- What specific situations are challenging?
- Have I had physical, occupational or speech therapy recently?
- What is my current exercise program? Could it be better?

19

What would be the best initial steps to take?

- Get Tested! **Hearing, Vision, Foot Health/Sensation, Bone Density**
- Note your challenges!
- Home modifications
- Talk to your doctors (PCP and Neuro) about medications
- Request referral for physical therapy, occupational therapy, speech therapy
- Begin or improve your exercise program!

20

Tracking Falls/Difficulty with Balance

- When does it happen
  - Certain time(s) of day?
  - With medication fluctuations? On or Off?
  - Do you feel lightheaded?
    - (do you have a blood pressure monitor?)
  - When you are rushing?
  - When you are distracted?
  - In a certain environment?
  - In a certain location or situation? (Steps, curbs)

21

Action Item #5: Home Modifications

- Remove obstacles inside and outside your home that could cause tripping.
- Install handrails on staircases, in restrooms and anywhere else that could be helpful!
- Make sure areas you are in at night are well lit!
- Store clothing, dishes, food, necessities within easy reach
- Paint/Tape doorsills with a different bright color to avoid tripping
- Smart Foot ware!!

22

Action Item #6: Optimize Medications!

- Bring tracking information about your function and how it relates to your medication schedule, to your neurologist visit
- Monitor blood pressure, which can commonly be lower in PWP and can be affected by Carbidopa/Levodopa.
  - You might need to adjust medications
  - Increase fluid intake
  - Aerobic Exercise
- Are you taking a benzodiazepine? Discuss with your neurologist.

23

Physical Therapy (PT), Occupational Therapy (OT), and Speech Therapy (SLP)!!

- All the therapy disciplines can help reduce falls in different ways!
- Physical Therapy tends to focus on balance, walking, transfers, multi-tasking within those tasks
- Occupational Therapy will often focus on Activities of Daily Living such as bathing, dressing, feeding, multi-tasking!
- Speech Therapy will likely focus on breathing, voice volume and clarity. Multi-tasking too!

24

EXERCISE!

- Your PT, OT and SLP can help you get started on a comprehensive exercise program!
- Some important notes about exercise:

25

Action Item #7: Optimize your Exercise Program

26

Optimal Meds = Optimal Exercise

CONCLUSION
"Levodopa and other forms of dopamine therapy should be used to achieve maximum capability and motivation for patients to maintain fitness!"

Is Vigorous Aerobic Exercise Neuroprotective?
(Progressive Aerobic Exercise Literature Review)
Ahlskog Je. Neurology 2011;77:288-294

27

How Should I Exercise?

Effects of Group, Individual, and Home Exercise in Persons With Parkinson Disease: A Randomized Clinical Trial

Laurie A. King, PT, PhD, Jennifer Wilhelm, PT, DPT, NCS, Yiyi Chen, PhD, Ron Blehm, DPT, John Nutt, MD, Zunqiu Chen, MS, Andrea Serdar, PT, NCS, and Fay B. Horak, PT, PhD

- **Results: Only the individual group significantly improved in the Physical Performance Test. The individual exercise showed the most improvements in functional and balance measures, whereas the group class showed the most improvements in gait. The home exercise program improved the least across all outcomes**
- Furthermore, people with PD who also have other comorbidities did better in a program directly supervised by a physical therapist

28

WHAT you do and HOW you do it are both important!!

- Progressive Aerobic Exercise for Brain Health:
  - Exercise which increases the heart rate and therefor increases blood flow up to the brain
  - Examples: Walking, Running, Cycling, Elliptical, etc
  - Must be progressive over time, can not be static
- Skill Based Exercise for Enhanced Circuitry:
  - Exercise where you are trying to improve the ability to do something
  - Examples: Amplitude Training, Tai Chi, Dancing, Boxing, Gait Training, Balance Training
  - Must be challenging and requires attention and awareness by the individual and feedback/coaching by a physical therapist

29

What Skills do we need to work on?

- Parkinson disease/Aging
  - **Small Movements**
  - **Slowness**
  - **Weakness**
  - **Posture Changes**
  - **Stiffness/Decreased Flexibility**
  - **Balance changes**
  - **Decreased Endurance**
  - **Function – Moving around in the house, moving in bed, etc.**
- ALL CAN BE ACCOMPLISHED THROUGH AMPLITUDE TRAINING!

30

Parkinson's Specific Exercise:

- Amplitude Training:
  - Exercise with goal of moving BIGGER than what feels normal
  - With increased size of movement, comes increased speed as well
  - Exercise is still completed within normal/healthy range of motion
  - Movements with best quality/kinematics
  - Goal is to re-wire the brain
  - Exercises are FUNCTIONALLY BASED for optimal carry over to real world activities
- Theory:
  - To be as PD specific as possible

31

How much do I have to Exercise?

"On how many of the past 7 days did you do at least 30 minutes of exercise?"

Days per Week of Exercise	N=1072 (%)	Predicted Change in PRO-PD Score (SE)	P-value (95% CI)
0	67 (6.2%)	-	-
1	48 (4.5%)	-7 (73)	0.923 (-151, 137)
2	104 (9.7%)	-39 (60)	0.516 (-158, 79)
3	145 (13.5%)	-146 (57)	0.011 (-258, -34)
4	156 (14.6%)	-172 (56)	0.002 (-282, -62)
5	205 (19.1%)	-209 (55)	0.000 (-316, -101)
6	148 (13.8%)	-231 (56)	0.000 (-341, -122)
7	199 (18.6%)	-245 (54)	0.000 (-352, -138)

Used with permission—Mischley LK. Social Health in PD.

32

32

Clinical Study

Intensive Rehabilitation Treatment in Parkinsonian Patients with Dyskinesias: A Preliminary Study with 6-Month Followup

Giuseppe Frazzitta,[1] Micaela Morelli,[2] Gabriella Bertotti,[1] Guido Felicetti,[1] Gianni Pezzoli,[3] and Roberto Maestri[4]

- A major adverse effect of levodopa therapy is the development of dyskinesia, which affects 30-40% of chronically treated PWP.
- This group hypothesized that their intensive rehabilitation protocol (IRT) might allow a reduction in levodopa dosage without worsening motor performances, thus reducing frequency and severity of dyskinesias
- 10 PWP underwent 4 week intensive (3 hours/day, 5 days/week) PT & OT program
- **At the end of IRT, levodopa dosage was significantly reduced, passing from 1016 +/- 327 to 777 +/- 333 mg/day**
- All outcome variables improved significantly by the end of IRT
- Results indicate it is possible to act on dyskinesias in PWP with properly designed rehabilitation protocols
- A non-invasive option, allowing reduction in drug dosage and related adverse effects

33

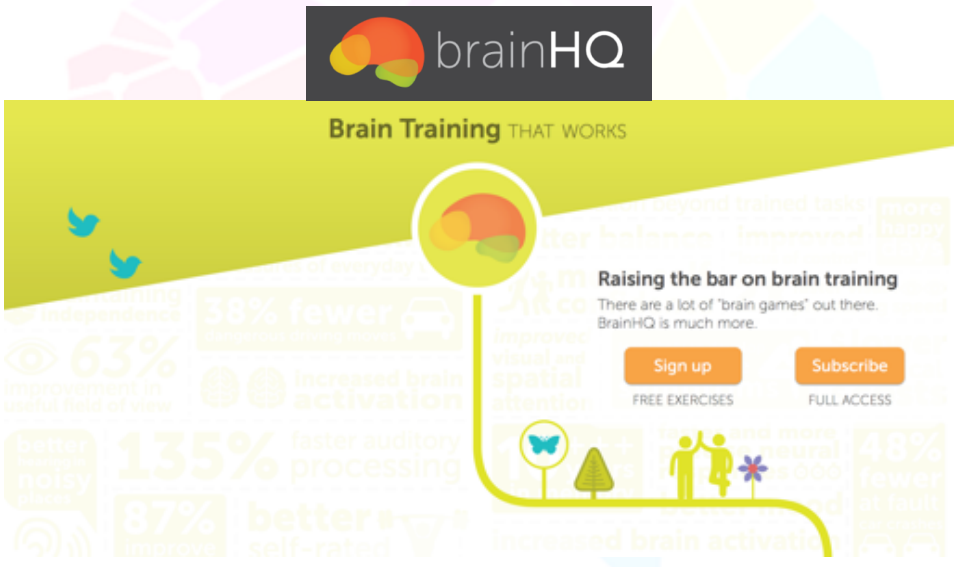
POTENTIAL MOTOR/NONMOTOR TARGETS OF AEROBIC EXERCISE IN GENERAL!

- Prevention of cardiovascular complications
- Arrest of osteoporosis
- Improved cognitive function
- Prevention of depression
- Improved sleep
- Decreased constipation
- Decreased fatigue
- Improved functional motor performance
- Improved drug efficacy
- Optimization of the dopaminergic system

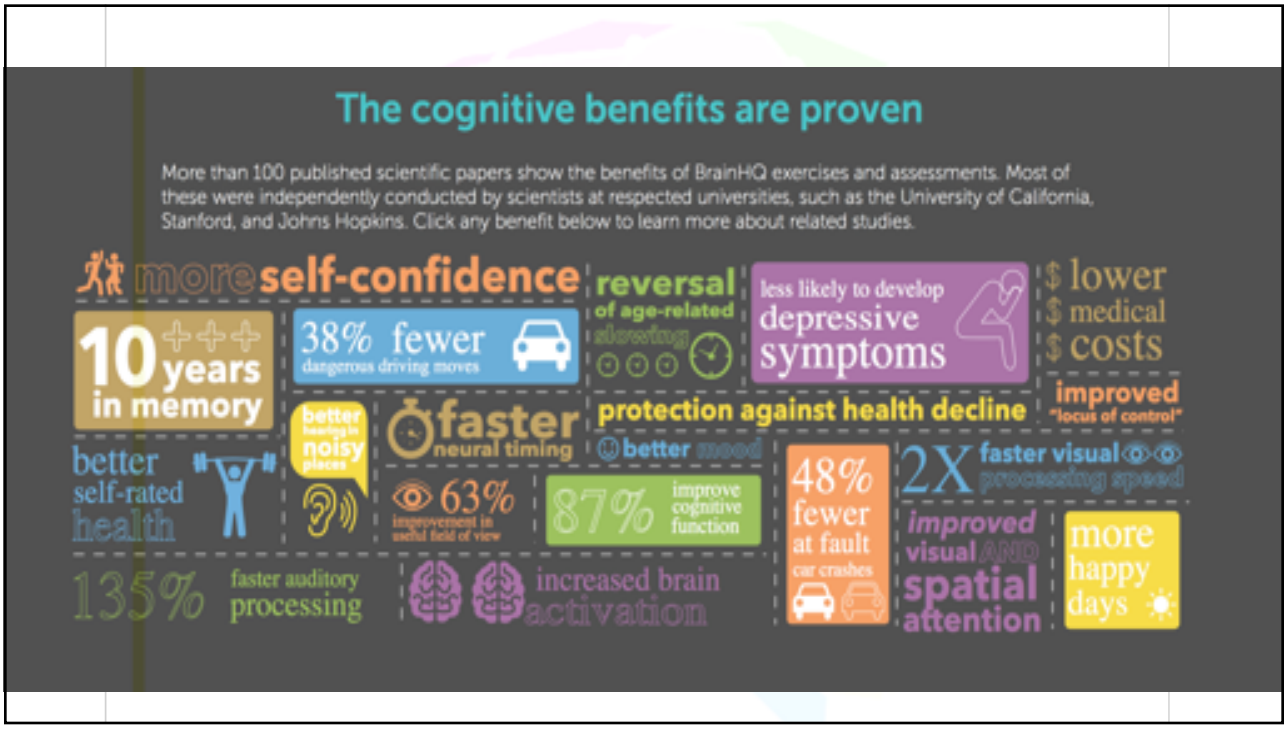
Speelman, AD *et al. Nature Reviews Clinical Neurology* 7, 528-534 (September 2011)

34

What about exercise for your brain??



35



39

100+ Published Research Studies

All brain training is not created equally. BrainHQ sets the gold standard. Simply put, no other brain-training program comes close to BrainHQ's level of scientific proof. Our exercises and assessments have been rigorously tested and scientifically proven to be beneficial in more than 100 independent, peer-reviewed research papers published in scientific journals—and many more studies are underway. BrainHQ has been shown to bring substantial improvements in each of these categories:

PARKINSON'S DISEASE

- Chou KL, Cronin-Golomb A. Feeling the need...the need for speed (of processing training) in Parkinson disease. Neurology. 2013 Oct 8;81(15):1278-9.
  View abstract
- Classen S, McCarthy DP et al. Useful field of view as a reliable screening measure of driving performance in people with Parkinson's disease: Results of a pilot study. Traffic Injury Prevention. 2009; 10(6): 593-98.
  View abstract
- Edwards JD, Hauser RA et al. Randomized trial of cognitive speed of processing training in Parkinson disease. Neurology. 2013 Oct 8;81(15):1284-90.
  View article

40

Processing Speed

Many of the BrainHQ exercises are designed to increase processing speed—how quickly (and accurately) the brain can process information coming in from vision and hearing. To date, 20 scientific papers have shown faster processing after training with BrainHQ exercises. This includes the ACTIVE study, one of the largest and most respected studies ever conducted on brain training in adults. Among other things, individual studies have shown:

- An average **increase in auditory processing speed of 135%**
- **A doubling, on average, in visual processing speed**, with some benefit of training still evident at 5- and 10-year follow-ups
- A partial **reversal of age-related neural slowing** and an improvement in temporal precision, as measured through brain imaging

Learn more >

41

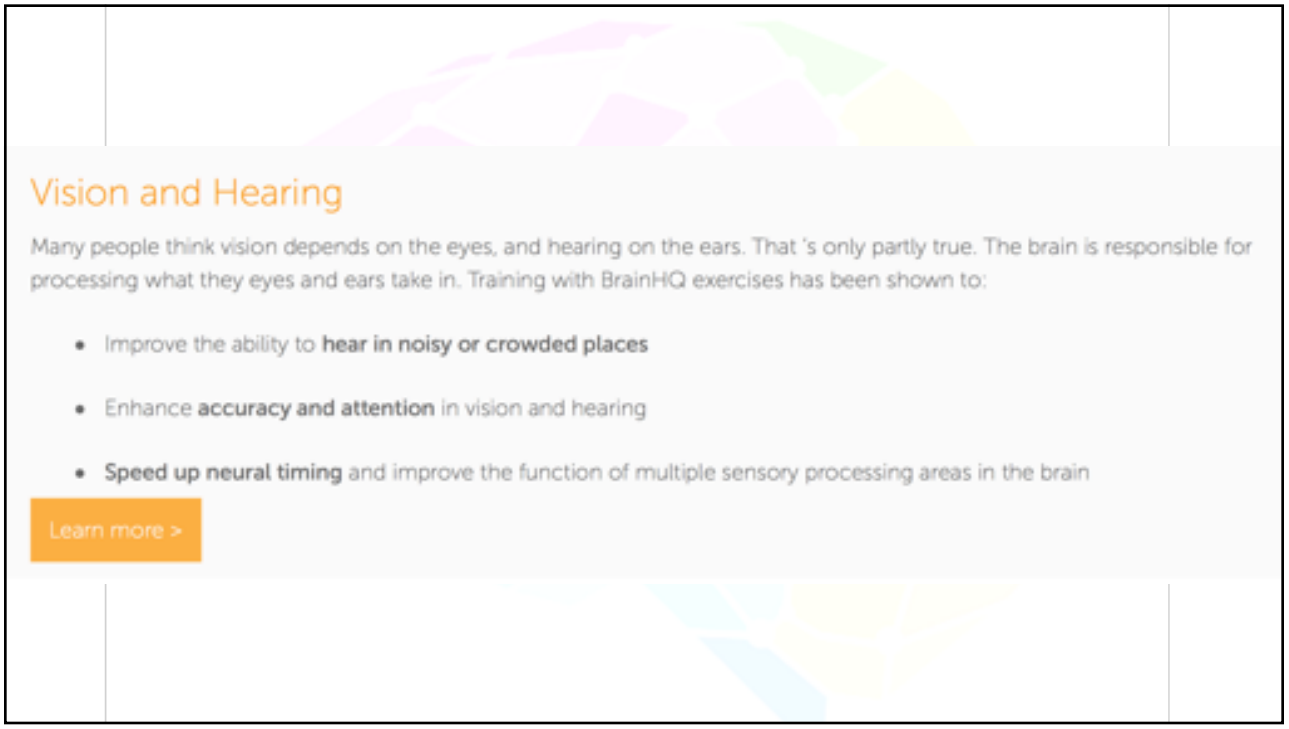
Attention

The ability to appropriately focus your attention is very important to feeling sharp. Not only do you have to pay close attention to what matters to you; it's equally important to be able to filter out the distractions. Seven published papers have shown that training with BrainHQ exercises can hone attentional focus including:

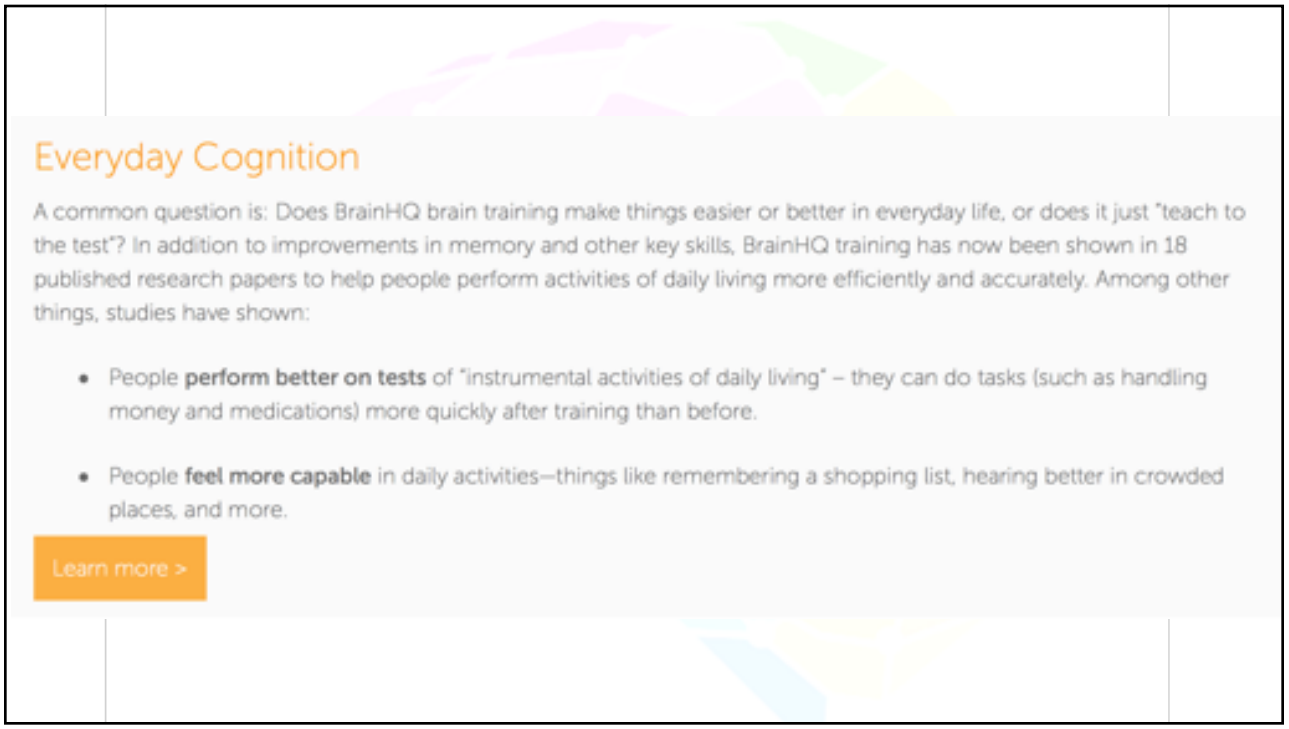
- Significantly changing brain behavior in ways that improve selective **visual attention**
- Improving **spatial attention**

Learn more >

42


Vision and Hearing
Many people think vision depends on the eyes, and hearing on the ears. That 's only partly true. The brain is responsible for processing what they eyes and ears take in. Training with BrainHQ exercises has been shown to:
Improve the ability to hear in noisy or crowded places
Enhance accuracy and attention in vision and hearing
Speed up neural timing and improve the function of multiple sensory processing areas in the brain
Learn more >

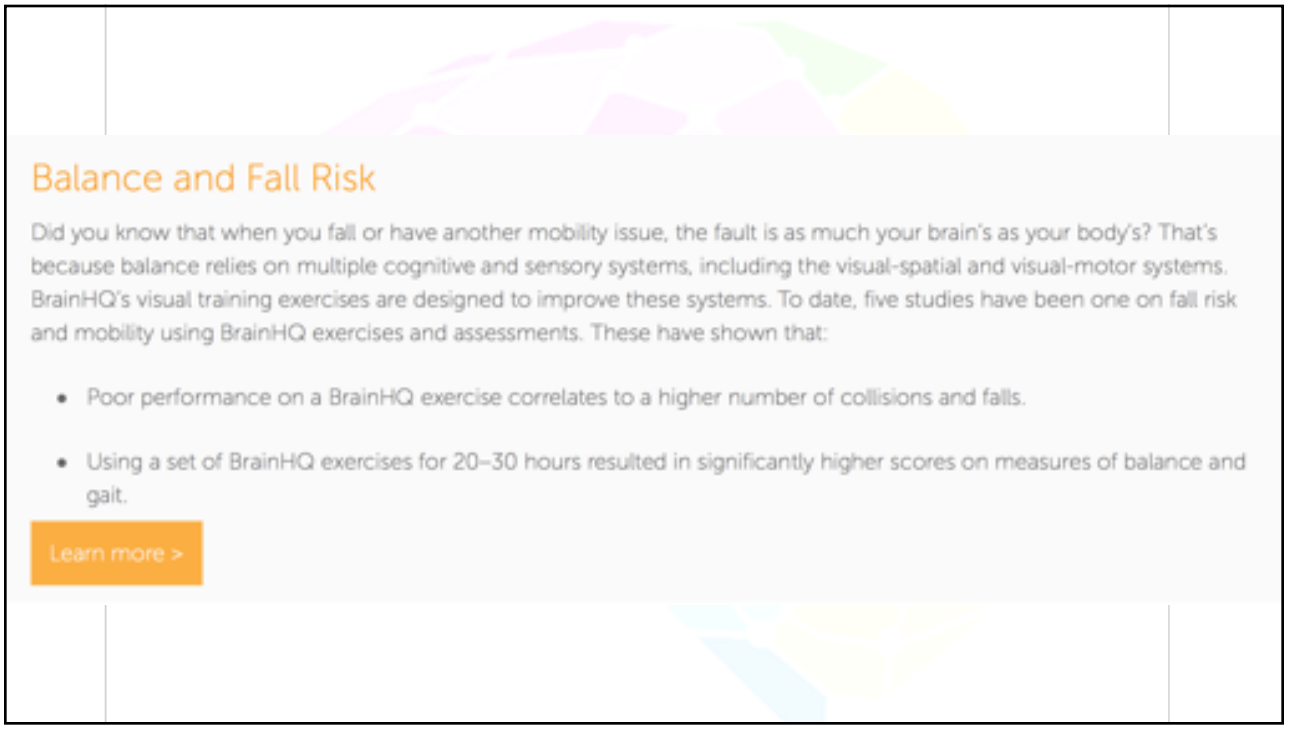
43


Everyday Cognition
A common question is: Does BrainHQ brain training make things easier or better in everyday life, or does it just "teach to the test"? In addition to improvements in memory and other key skills, BrainHQ training has now been shown in 18 published research papers to help people perform activities of daily living more efficiently and accurately. Among other things, studies have shown:
People perform better on tests of "instrumental activities of daily living" – they can do tasks (such as handling money and medications) more quickly after training than before.
People feel more capable in daily activities—things like remembering a shopping list, hearing better in crowded places, and more.
Learn more >

44


Medical Costs
To date, two studies have demonstrated that using exercises in BrainHQ can reduce average health care expenditures. The larger of the two, based on the ACTIVE study data, showed that using BrainHQ significantly reduced healthcare costs one year post-training. Costs continued to be lower 5 years later.
Learn more >
Health
It might seem like a stretch, but better brain fitness may, in some cases, actually lead to better health. Several studies have shown that using BrainHQ exercises can help protect health over time:
Two papers have shown that people who used a BrainHQ exercise were protected against declines in health-related quality of life two and five years later.
One paper showed that people's self-rated health was higher among people who used BrainHQ's training as opposed to memory or reasoning training not from BrainHQ.
Learn more >

45


Balance and Fall Risk
Did you know that when you fall or have another mobility issue, the fault is as much your brain's as your body's? That's because balance relies on multiple cognitive and sensory systems, including the visual-spatial and visual-motor systems. BrainHQ's visual training exercises are designed to improve these systems. To date, five studies have been one on fall risk and mobility using BrainHQ exercises and assessments. These have shown that:
Poor performance on a BrainHQ exercise correlates to a higher number of collisions and falls.
Using a set of BrainHQ exercises for 20–30 hours resulted in significantly higher scores on measures of balance and gait.
Learn more >

46

Ready to start??

- www.BrainHQ.com
- Training with friends helps a lot. Share the challenge with others! Organize a time/place to get together once a week and you will likely experience more success!

47

In Summary:

- Talk to you doctors about your medications
- Do a safety assessment of your home
- Participate in PT, OT and SLP
- Exercise your body regularly
- Exercise your brain regularly!

48

49

References

- National Council on Aging (NCOA). "Falls Prevention Facts." Web. 2015.
- Mayo Clinic. "Fall Prevention: Simple Tips to Prevent Falls". Web. 2014.
- Learn Not to Fall. "How Often Falls Occur". Web. 2012.
- Allen et al 2012 Recurrent Falls in Parkinson's Disease: A Systematic review (Full text: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3606768/pdf/PD2013-906274.pdf)
- Bloem et al 2001 Prospective assessment of falls in Parkinson's disease (https://www.ncbi.nlm.nih.gov/pubmed/11757958)
- Ahlskog 2011 Does vigorous exercise have a neuroprotective effect in Parkinson disease? (full text: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3136051/pdf/znl288.pdf)
- King et al 2015 Effects of Group, Individual, and Home Exercise in Persons with Parkinson Disease: A Randomized Clinical Trial (Full text (different title for some reason: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4772717/pdf/nihms-759696.pdf)
- Frazzitta et al 2012 Intensive Rehabilitation Treatment in Parkinsonian Patients with Dyskinesias: A Preliminary Study with 6-Month Followup (Full text: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3372063/pdf/PD2012-910454.pdf)
- Speelman et al 2011 How might physical activity benefit patients with Parkinson disease? (Full text: https://www.dcconferences.com.au/wcnr2012/pdf/nrneurol_2011_107_corrected.pdf)
- https://www.brainhq.com/world-class-science

50