



# Exercise and the Brain

**MAJ (Dr) Jacques Rousseau**

**PhD (Human Performance)**

**OIC Human Performance Cell**

**Joint Support Group**



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**Exercise has a profound impact on the brain, leading to numerous cognitive and mental health benefits.**

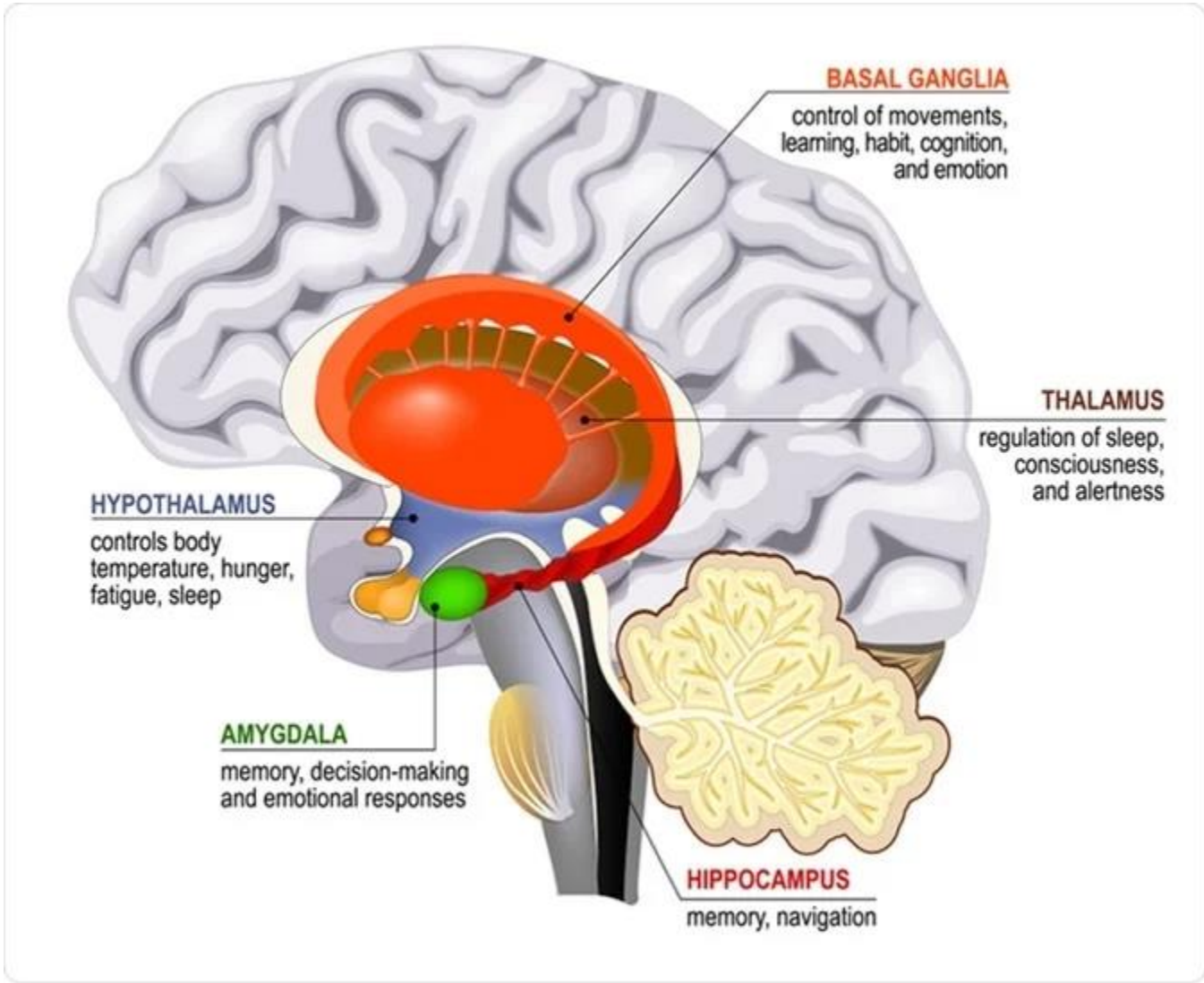
**Following are some ways in which exercise affects the brain:**

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- **Increased blood flow and oxygen delivery**
  - **Neurotransmitter regulation**
  - **Neurogenesis**
  - **Enhanced cognitive function**
  - **Reduced stress and anxiety**
  - **Improved sleep**
  - **Protection against neurodegenerative diseases**

# Brain Derived Neurotropic Factor (BDNF)

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- Brain fertiliser
- Spurs the creation of neurons in the hippocampus
- Exercise boosts the number of mitochondria
- Together these seem to bolster against dementia and Alzheimer's disease



# BDNF

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- ↑ BDNF – at least 30min of daily exercise
- Brisk walking or cycling
- Better ↑ BDNF – vigorous exercise – HIIT
  
- Prolonged sedentary behaviour can wipe out benefits

# Walking and Running

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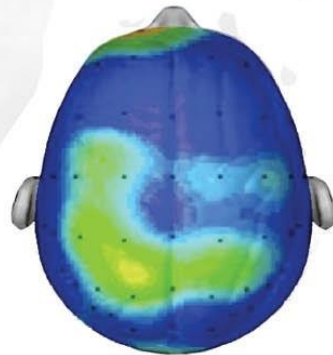
- Running and walking at easy pace – allows mind to wonder
- Temporarily reduces activity in the prefrontal regions of the brain
- Rational, straight line thinking – reducing these activities allows for broader more creative thinking
- Effects last for up to 15mins after finished



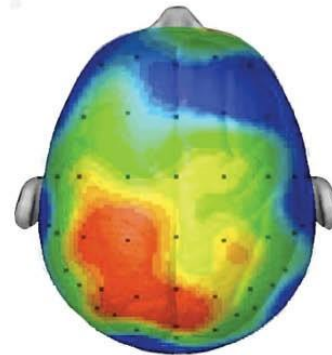
# YOUR BRAIN AFTER EXERCISING

COMPOSITE OF 20 STUDENT BRAINS TAKING THE SAME TEST

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AFTER SITTING QUIETLY



AFTER 20 MINUTE WALK



# Strength Training

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- Stronger people have more grey matter
- Osteocalcin – hormone released from bones when we move against gravity in any form of weight-bearing exercise
- Studies link it to size and connectivity of the hippocampus
- Studies reveal body has an unconscious sense of the health and state of our muscles and bones – “musculoskeletal division”

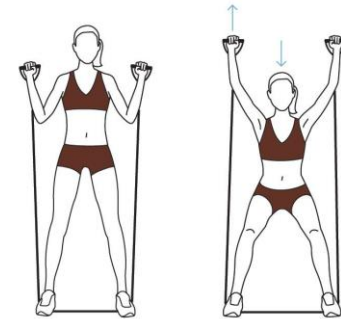
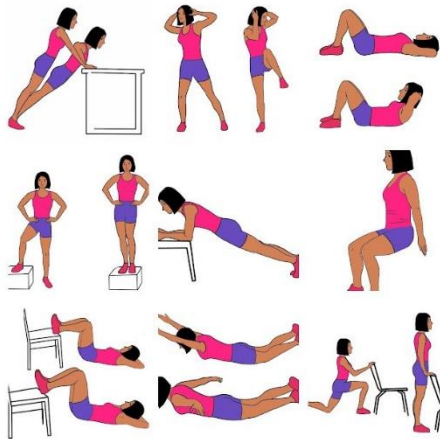
# Strength Training

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- Constantly sends messages about the strength and agility of the body's movement apparatus
- Feeds into our implicit sense of what we can handle
- Decreasing levels of strength in modern society may play a part in increasing levels of anxiety and depression

# Strength Training

- Resistance training
- Body weight exercises
- Rubber bands



# Exercise and Mental Health

## Boost Happy Chemicals

Exercise releases endorphins which create feelings of happiness. Studies have shown that exercise can even alleviate symptoms among the clinically depressed.

## Reduce Stress

Exercise increases concentrations of norepinephrine, a chemical that can moderate the brain's response to stress.

## Improve Self-Confidence

On a very basic level, physical fitness can boost self-esteem and improve positive self image.

## Enjoy the Outdoors

Vitamin D acquired from soaking up the sun (while wearing sunscreen of course) can lessen the likelihood of experiencing depressive symptoms.

## Prevent Cognitive Decline

Diet and exercise can help shore up the brain against cognitive decline that begins after age 45. Working out, especially between 25 and 45, boosts chemical in the brain that support and prevent degeneration of the hippocampus, an important part of the brain for memory and learning.

## Alleviate Anxiety

The warm and fuzzy chemicals that are released during and after exercise can help people with anxiety disorders calm down.

## Boost Brainpower

Various studies have shown that cardiovascular exercise can create new brain cells (aka neurogenesis) and improve overall brain performance.

## Sharpen Memory

Regular physical activity boosts memory and the ability to learn new things by increasing the production of cells in the hippocampus responsible for memory and learning.

## Increase Relaxation

For some, moderate workout can be the equivalent of a sleeping pill, even for people with insomnia.

## Be More Productive

Research shows that workers who take time for exercise on a regular basis are more productive and have more energy than their more sedentary peers.

