

## Healthy body, healthy brain

### How can physical exercise help me keep my mind sharp and my brain healthy?



### The importance of being physically active

#### Warming up the brain...

We know that regular exercise contributes to a healthy lifestyle by decreasing the risk of heart disease and strokes, high blood pressure and diabetes, and improving mood. In addition, several studies suggest that regular exercise is also very important for keeping the brain healthy during the many changes that occur throughout our lifetime. As we grow older, there are physiologic (natural) changes in the structure and function of the brain that result in changes in cognition.

### Let's define some important terms...

1

#### COGNITION

"Refers to the mental functions involved in attention, thinking, understanding, learning, remembering, solving problems and making decisions."

(Institute of Medicine Report on Aging, 2015)

2

#### COGNITIVE AGING

"It is not a disease or a quantifiable level of function. It is a process of gradual, ongoing, yet highly variable changes in cognitive functions that occur as people get older."

(Institute of Medicine Report on Aging, 2015)

3

#### PHYSICAL EXERCISE

"The execution of activities in a planned, structured manner to maintain or increase physical fitness, health and wellness."

(Bherer et al, 2013)



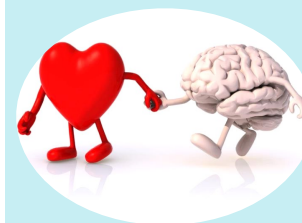
#### Type of exercise

How should I exercise if I want to keep my brain healthy and my mind sharp?



#### Be Alert

Listen up! Some useful information.



#### Heart and Brain

Improvements in cardiorespiratory fitness appear to coincide with improvements in cognition

## Why should I keep reading this booklet?

Learn about how to exercise if you would like to promote brain health and improve your quality of life!

Here you will find information about:

1- How to determine if you are sedentary (i.e., Do I not get enough exercise?) and need to exercise more

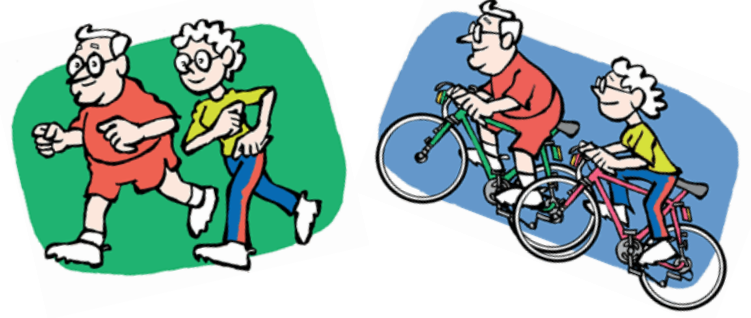
2- Learn more about the beneficial effects of exercise in brain health

If you are sedentary, no problem! There is also specific information on how to:

3- Get started on exercise if you feel mental sharp and have never been diagnosed with cognitive deficits before

4- Get started on exercise if you have been diagnosed with mild cognitive deficits

5- Help a family member or friend who has moderate to severe cognitive deficits to get started on exercise



**Attention! Before deciding to start a new Exercise Program for yourself or for a friend/loved one, talk with your health care team to make sure you are physically fit. It may be necessary to obtain medical clearance to begin!**

A closer look at the scientific research related to The Brain on Exercise

Take advantage of this book and enjoy learning more about this topic!

You will not only learn about the latest scientific articles, but also, how our scientists are making these recommendations. Enjoy!

**You are one step closer to a healthier lifestyle!**



# How does exercise affect my brain?



## Which areas of the brain undergo the greatest changes as we age?

While health in the whole brain is important, we also know that aging has specific effects on the brain.

- The areas mostly affected are those that control cognitive function, learning and memory.
- These are the pre-frontal areas and the hippocampus.

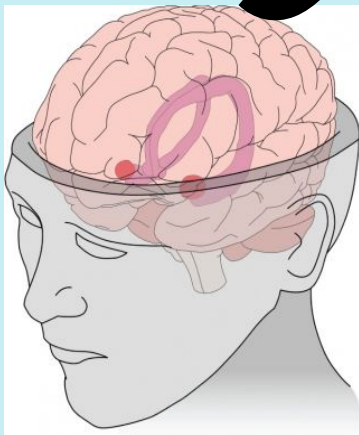
## What does it mean to have a healthy brain?

A healthy brain is represented by having overall good health, and the ability to successfully carry out daily tasks such as work, have fun and actively participate in society.

## Pre-frontal cortex: an important area for cognitive function



## Hippocampus: an important area for learning and memory



## What changes happen in these areas as we age?

The science is fast-paced, and we are always discovering new things. We will focus on well-described patterns of changes that affect two important brain areas: pre-frontal areas (top, right) in the hippocampus (bottom, left).

As we age, there is a tendency for the brain to shrink in size, more in some areas than in others. The current idea is that there is a decrease in the volume of neurons in the pre-frontal areas and in the hippocampus. These brain changes have been linked to decreased memory performance, and are more pronounced in the presence of a diagnosed cognitive deficit.

# How to warm up?

## Why do it?

Warming up is very important, as it slowly sets the stage for your body to enter the aerobic state after being at rest. By warming up, you slowly increase your breathing and heart rate, which are both going to work hard to supply your muscles with much-needed oxygen. Also, you increase the lubrication of your joints, which will help prevent injuries. This gradual process is more safe for your heart and muscles.

## What is considered a warm-up?

You have many options to choose from here!

- 1) Short bouts of movement (3-5 mins) that involves both the upper and lower body. All exercises in Box 1 can be used for a warm-up
- 2) 3-5 mins of dynamic stretching. This type of warm-up is especially important if you are going to do a resistance training (strength) workout. During every stretch, do 10 repetitions in each member, and breathe. Below you can find a sample whole-body stretch routine.
- 3) Research shows that flexible muscles produce greater force, so get to stretching!

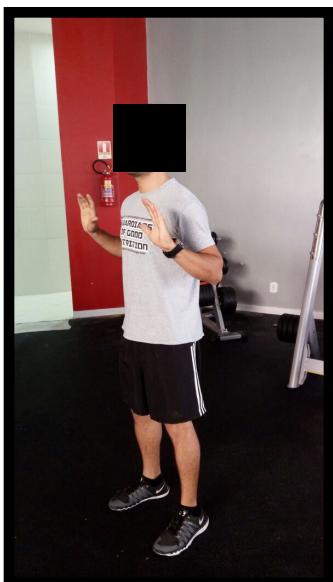
REMEMBER: Start slow and work your way up in intensity each time you warm-up (even in the pool!)

See the examples below!

i'm tired  
it's too cold  
it's too hot  
it's raining  
i don't have time

LET'S GO.

GET GO'



**Front push:** Standing or sitting with torso in good posture position. Place hands out in front of the chest (palms forward like you are going to push something) at slightly lower than shoulder height – upper and lower arms should create a 90 angle. Push hands forward until arms are fully extended and then return to starting position. Repeat.

**Arms above head:** Standing or sitting with torso in good posture position. Bring arms up so that you form a “goal post” or are in the “stick-em up” position. Keeping the back in a neutral position and knees soft, push one hand at a time up towards the ceiling and then bring it back down to the starting position. Repeat.

# Aerobic exercises

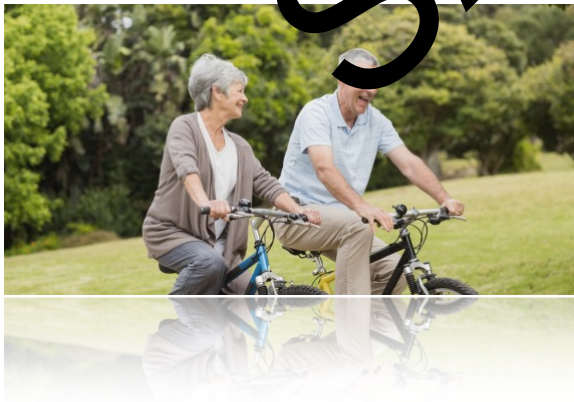


## Why do it?

Your heart, lungs and muscles work hard during aerobic exercise (cardio). For this reason, cardio is effective for improving your tolerance to exercise, which means that your body becomes more effective in burning fat also (an added bonus!). Finally, increasing your exercise tolerance should make it easier for you to do your daily activities.

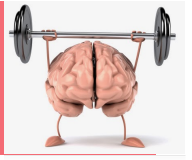
## Things to remember

- 1) Again, try many different forms of aerobic exercise to find something that is fun and works well. But also remember to switch up, and vary your exercise types every once in a while. Check out Box 1 for a list of aerobic exercises to choose from!
- 2) You may do different types of exercise in a single session. Mix and match for a workout that never gets boring!
- 3) Be sure to warm up before your workout, especially if you are planning for a more intense aerobic exercise session
- 4) Keep track of your heart rate during aerobic exercise if you can. You can use a heart rate monitor, or you can also do it manually by palpating (touching) your wrist or your neck. If you choose to do it manually, count the beats in 15 seconds, multiply that number by 4, and you will find your heart rate, or 'beats per minute'.



**TO AVOID HEALTH PROBLEMS, SEE THE NEXT PAGE AND BE FAMILIAR AT HOW TO CALCULATE TARGET HEART RATE AND PERCEIVED EXERTION**

# Strength exercises



## Why do it?

Consistent resistance training (also known as strength training or weight training) will also contribute to your health by improving strength and endurance (tolerance) of your muscles. This type of training also improves the rate at which you burn calories (an added bonus!).

## Safety

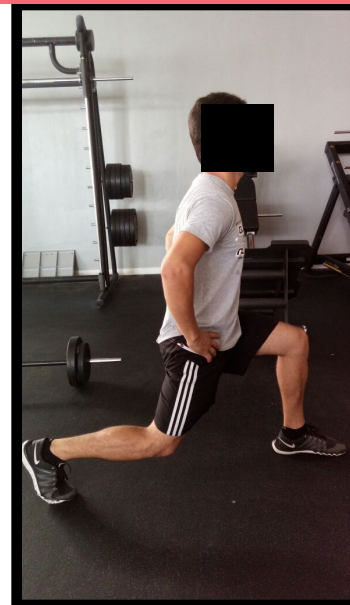
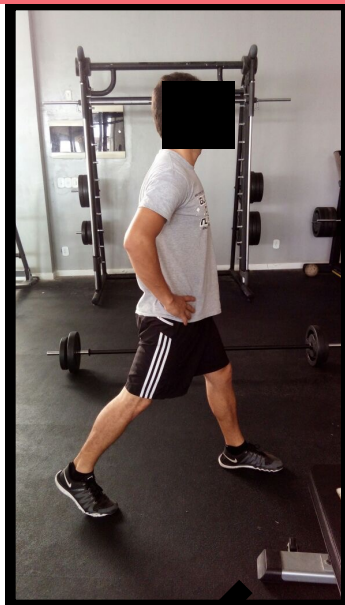
- 1) Always warm-up before and cool-down after
- 2) If using weight, make sure you have selected a weight that makes the exercise "challenging" but "doable in good form"
- 3) Use a steady pace. One good way to do it is to time movement with breathing (for example: flex your arm when you breathe in, and extend your arm when you breathe out).
- 4) Rest for about 30 seconds in-between sets.
- 5) Proper posture at all times. When standing, keep your feet aligned with your shoulders, keeping a "wide base of support". This position makes you more stable and protects your lower back.



## Designing a resistance workout

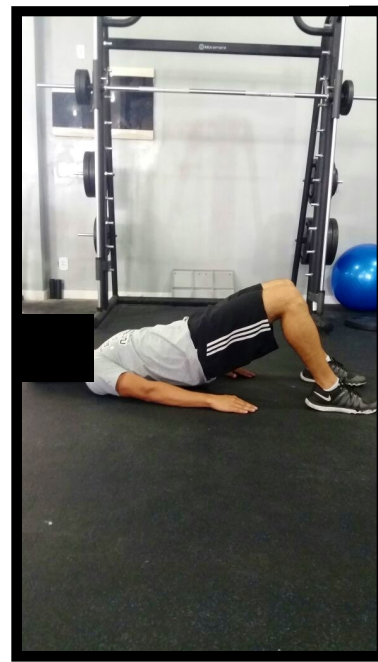
- 1) Pick at least one exercise from each major group (as per the pictures and descriptions).
  - A. Chest
  - B. Hip/Leg (thigh)
  - C. Upper Back
  - D. Shoulder
  - E. Back of lower leg (shanks)
  - F. Back of upper arm (triceps)
  - G. Abdominals
  - H. Front of Upper Arm (biceps)
  - I. Lower Back
- 2) Each time you tackle a muscle group, do a different exercise (unless you have pain or another restriction). Different exercises ensure that your muscles are worked in different ways.
- 3) One good idea is to alternate between upper and lower body exercises during your workout. In this way, you let one body part rest while the other is working.
- 4) If the exercise is too easy, reach for a set of dumbbells. If you don't have one, you may be able to substitute for a household item (soup can, soda bottle filled with water, etc).

## Upper leg exercises (Hams and Quads)



**Sit to Stand:** Keep back straight and feet shoulder width apart. This exercise can be done in any chair or on the weight bench. For extra intensity, hold dumbbells in your hands.

**Lunge:** Keep back straight. Start by going halfway down and progress to full lunge where knee touches the floor. Extend front foot far enough so that the knee does not go past the toe during the lunge. For extra intensity, hold dumbbells in your hands.



**Supported Squats:** Keep back straight. Try to lift body with legs, not arms. Start by going halfway down at first, then progress to full squats.

**Bridge:** Lie on your back with your knees bent and your feet flat on the floor. Raise your hips off the floor so that your body forms a straight line from your shoulders to your knees. Pause at the top then slowly lower your body back to the floor. Repeat.

### Other upper leg exercises to do at home or gym:

- Wall Ball Squats;
- Knee lifts;
- Seated Leg Extension with Band;

- Leg Press Machine;
- Leg Extension Machine;
- Seated Leg curl.

# Cooling Down

Don't forget! After any exercise you have to do a cooling down session.



## Why do it?

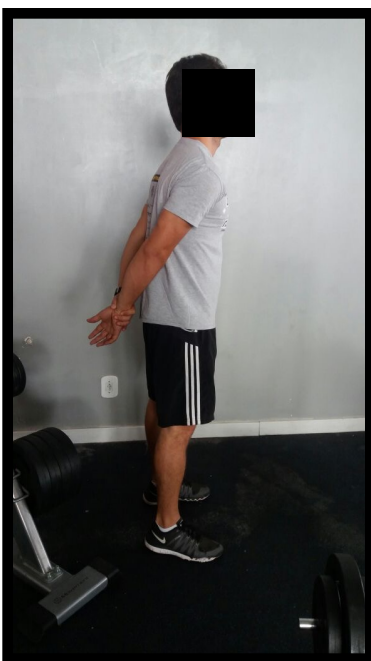
Cooling down is very important as you let your heart, lungs and muscles slow down as you slow down your movements. This increases safety from the cardiovascular perspective, and it also helps prevent soreness as it "flushes out" toxins and substances produced while you were exercising. What is considered a warm-up?



## How to do it?

- 1) Very light aerobic activity Short bouts of movement (2-3 mins) that involves both the upper and lower body. All exercises in Box 1 can be used for a cool-down.
- 2) 5-10 minutes of slow/static stretching – since our muscles are warm, this provides a chance to really improve our flexibility. NOTE: slow/static stretching can be done without previous exercise, but your movements should be even more gradual and no as extreme. All of the stretches below should begin with a slow stretch from the start to finish position to a 10

count – this motion should be smooth: no “herky, jerky” movements. The finish position should be the point where you feel mild discomfort (the point where you “feel it” – you should never feel any sharp, severe pain – if you do: STOP!). By the time you get to “8,9,10” in your count, you should be in the finish position (NOTE: you may stretch further than the person in the pictures!). Once you are in the finish position, hold this position in place for 15-30 seconds. Remember to breathe normally throughout the stretch. These stretches may be repeated more than once for added benefit. (see pictures/descriptions).



**Handcuff:** Standing or sitting with torso in good posture position. Clasp hands behind back. Keeping arms straight, lift your hands up toward the ceiling without leaning.



**Side Lean:** Standing or sitting with torso in good posture position – feet should be wide. Lean in the both sides.



**Arm cross:** Seated or standing, grasp the back of the arm and pull it slowly across the body. Switch arms and repeat.



# Mind-body exercises can also promote brain health

## Exercise is particularly effective for a number of reasons:

- Endorphins are substances that when released in the brain, cause an improvement in mood. Endorphins are released during exercise.
- Exercise can offer a healthy release of frustrations and stress;
- Increases in blood flow can help flush out toxins and metabolic waste products;
- Stretching can help relieve tension and pain.

## The body needs the proper rest and nutrition to cope with distress.

- Enjoy leisure time;
- Get enough sleep;
- Eat a healthy diet ;
- Don't forget to laugh.

## RELAXATION TECHNIQUES

Relaxation techniques can be useful to help manage stress as well as tension, depression, anxiety, nausea, and pain. These techniques may help in the achievement of a positive attitudes, which can be helpful to control anxiety and how one responds to unpleasant stimuli.

Examples of relaxation techniques include:

- Progressive muscle relaxation
- Hypnosis
- Mental imagery
- Acupuncture
- Simple deep breathing

## PILATES

The Pilates method is a physical fitness system developed to encourage the use of the mind to control the muscles. Instead of performing many repetitions of each exercise, Pilates prefers fewer, more precise movements, requiring proper control, proper form, and strength.



## TAI CHI

Tai Chi is a form of exercise or martial art developed in China and characterized by slow, rhythmic, circular movements that focus on self-defense and emotional/cognitive control. Tai Chi combines attention, relaxation and coordination to generate movement. These precise, slow movements stimulate attention to the present moment, an increased awareness of yourself and the world that surrounds you.



## YOGA

Yoga is an ancient Indian practice that dates back more than 500 years. Yoga postulates that inner harmony is achieved through integration of mind, body and spirit in the form of exercises, breathing and meditation. Yoga improves circulation, strength, balance and flexibility.



# The role of nutrition in an exercise program



## Benefits of a proper nutrition

Regular exercise and proper nutrition play a vital role in your ability to maintain your overall health and quality of life. Besides that, an exercise program can help maintain a healthy weight and reduce the risk of cardiovascular disease. Your body needs quality fuel and proper maintenance to function optimally.

## What do we need to do to have a proper nutrition?

In order to function optimally, your body needs carbohydrates, fat and proteins. Try your best to get these elements from whole foods (i.e., actual food sources, and less from processed sources). Look at the back of your food labels; go for foods with ingredients that you can pronounce! That usually means less chemicals and additives.

### CARBOHYDRATE

Carbohydrates or "carbs" get a bad rep, but they are very important for a balanced diet, especially if you are exercising. Good sources are fruits, vegetables and grains. Carbs are the easiest source to convert to energy, and so you should plan for half of your energy to come from carbs. One gram of carbohydrate contains 4 calories.

### FAT

Fats are important nutrients, as they support many cellular processes and reduce inflammation. Fat should make up about one third of your calories. Try to not overdo it on saturated fats (butter, lard, fatty meat, solid shortening), as these fat sources can raise your cholesterol levels. One gram of fat contains 9 calories, so moderation is key!

### PROTEINS

Protein is also a very important nutrient, as it is contained in basically every body part or tissue in the human body. About one quarter to one third of your calories should come from protein sources. Try to choose protein sources that are low in saturated fat, such as fish, poultry, lean meats, eggs, nuts, seeds and beans. One gram of protein contains 4 calories. Protein intake is very important, as it supplies your body with the building blocks to repair muscles after exercise. The general recommendation is that you should have 0.8g of protein per kg of body weight of protein.

Ex:  $150\text{lbs} = 150 / 2.2 = 68.1\text{kg}$   
 $68.1 \times 0.8 = 54.4$  grams of protein



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