



# TAMING DEPRESSION & IMPROVING **WELLNESS** **WITH EXERCISE**

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## PHYSICAL EXERCISE & MENTAL HEALTH: Is It Time To Build Exercise Into Our Daily Routines?



### PHYSICAL EXERCISE

#### How Can It Possibly Help Me Control My Depression?

Great question! While we all instinctively know that when exercising we feel better, it's important we use science to better understand how physical exercise might help us in taming depression. It's now firmly believed that physical exercise directly benefits the brain, especially in those parts that control our mood. This is great news but let's not stop there. Physical exercise seems to actually increase the size of the parts of the brain that are harmed by depression. All the more reason to get moving! Please take a moment and consider some important facts below about depression:



Depression can be a serious medical problem

It leads to tiredness and fatigue

It takes away motivation and drive

It is a treatable illness

Both medication and non-medication treatments are used (either together or individually) to help people recover. The combination of the two are more effective than either one alone.

**PLEASE REMEMBER THAT RECOVERY FROM MAJOR DEPRESSION IS POSSIBLE!**

However, active effort is needed to defeat it and keep it from returning!

# WHAT PHYSICAL EXERCISE DOES FOR OUR BRAIN & BODY

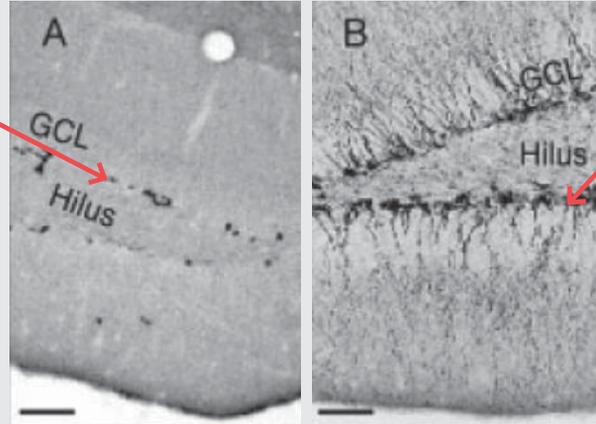


## Physical Exercise Changes Our Brains:

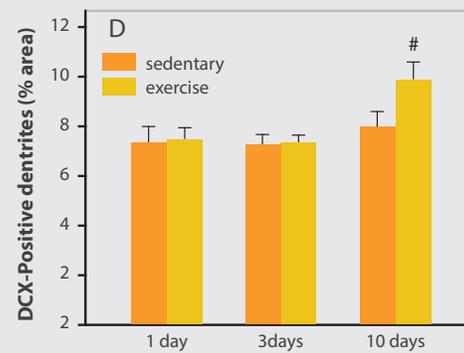
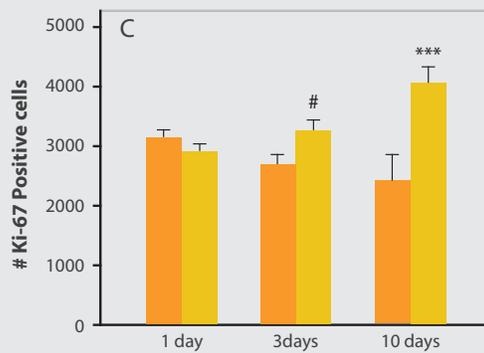
When we exercise our muscles, our brain also benefits. Both animal and human studies show this to be true. Look to your right, here you will see that in animal models physical exercise actually creates new cells in the hippocampus. This part of the brain is often damaged during a depressive episode. The fact that physical exercise strengthens this part of the brain is very welcome news!

Ki 67 positive newly generated cells

## Exercise's Effects on Hippocampal Cell Proliferation & Neurogenesis



DCX positive young neuronal cells

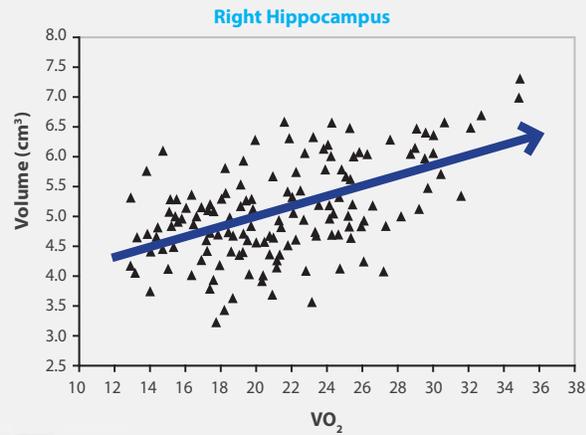
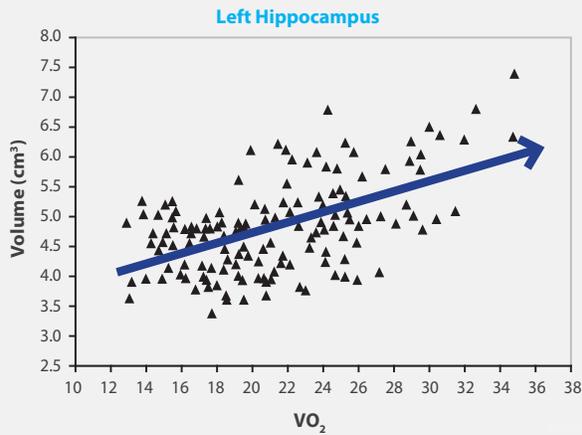


Van der Borgh K, et al. *Hippocampus*. 2009; ahead of publication.



Saundra Jain, MA, PsyD, LPC & Rakesh Jain, MD, MPH

**Fitness & Hippocampal Volume**  
Further Reason to bring Exercise into our Rx Plan



**People That Exercise Regularly Have A Bigger Hippocampus:**  
This is very exciting news! The graph at the top tells us that we can both reverse brain changes caused by depression and we can reduce the chance of depression returning by exercising regularly. *How can you say no to that?*

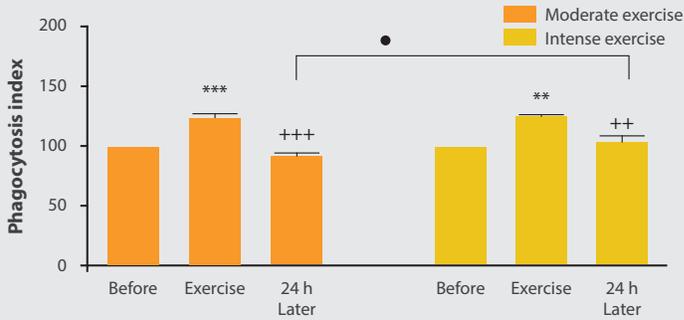
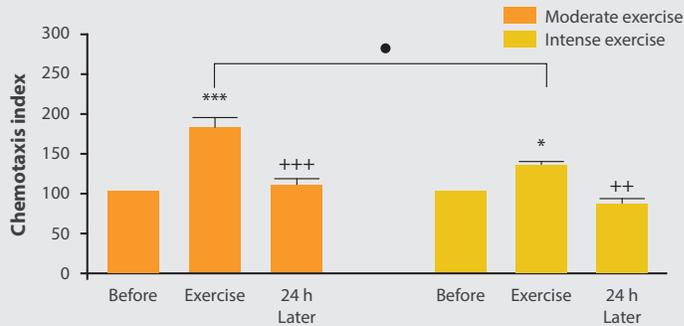


- Scatterplots showing increase in fitness (VO<sub>2</sub> peak) is related to increase in hippocampal volume (cm<sup>3</sup>)
- Correlations significant for both left and right (even after including age, sex, years of education as covariates)

Van der Borgh K, et al. *Hippocampus*. 2009; ahead of publication.

**Exercise's Effects on Immune Functioning**

Single bout of 45-60 minutes of exercise in sedentary women



Moderate exercise = 45 minutes at 55% VO<sub>2</sub> max  
Intense exercise = 60 minutes at 70% VO<sub>2</sub> max

Giraldo E, et al. *Neuroimmunomodulation*. 2009;16:237-244.

**Physical Exercise Can Positively Affect Even The Smallest Cells In Our Bodies – The Macrophage (a type of white blood cell):**

There are billions of cells in our bloodstream that fight infection and boost our immunity.

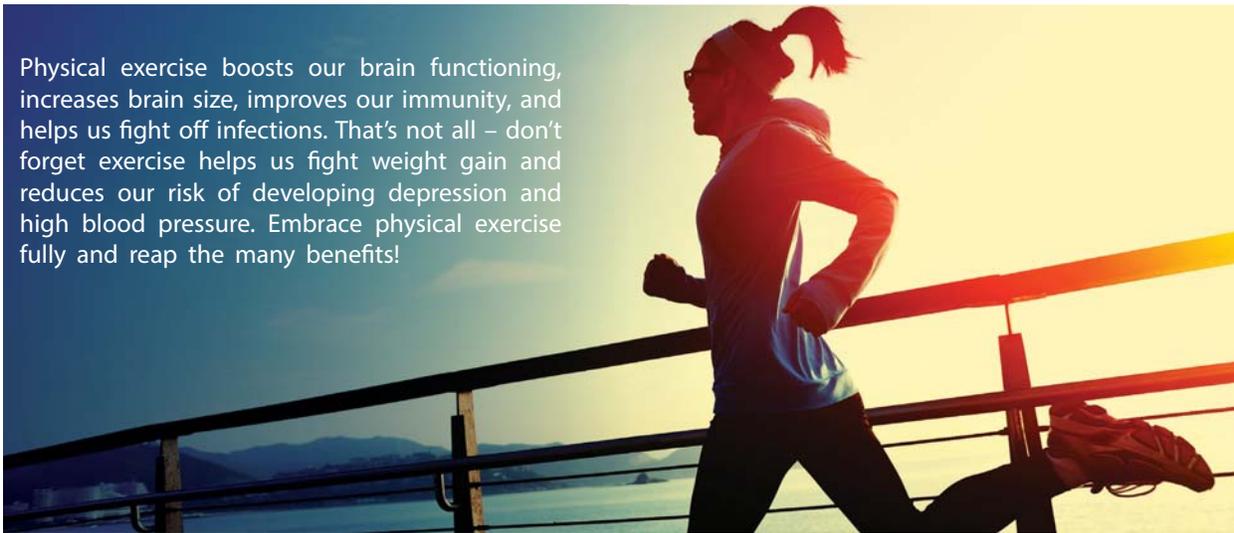
Exercising, even one time, makes these cells more powerful, better able to fight infection, and boosts our immunity. Again, how can you say no to that? Physical exercise is truly amazing in all that it offers.



## WHAT HAVE WE LEARNED SO FAR?



Physical exercise boosts our brain functioning, increases brain size, improves our immunity, and helps us fight off infections. That's not all – don't forget exercise helps us fight weight gain and reduces our risk of developing depression and high blood pressure. Embrace physical exercise fully and reap the many benefits!



### HOW WELL DOES PHYSICAL EXERCISE WORK IN COMBATING DEPRESSION?

As it turns out, physical exercise has been studied extensively in individuals that suffer from major depression. The results are very promising. We now know that exercise helps reduce depression and here's the evidence:

#### Cochrane Database Weights On...

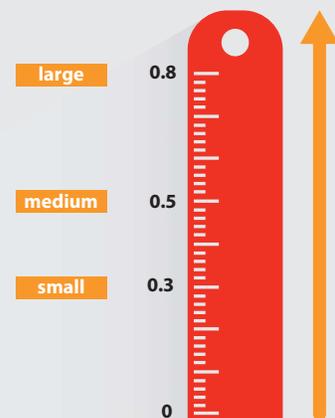
- 01 Meta-analysis of 25 studies
- 02 Exercise did improve symptoms of depression
- 03 Evidence suggests that exercise probably needs to be continued in the longer-term for benefits to be maintained
- 04 Comparison made with controls, psycho-therapy and pharmacotherapy

Mead GE et al. *Cochrane Database of Systemic Reviews*. 2008 Oct 8;(4):CD004366.

Review of the top 25 studies tells us that exercise improves symptoms of depression. Remember, this isn't just our opinion but is based on well-designed studies looking at exercise's impact on depression.

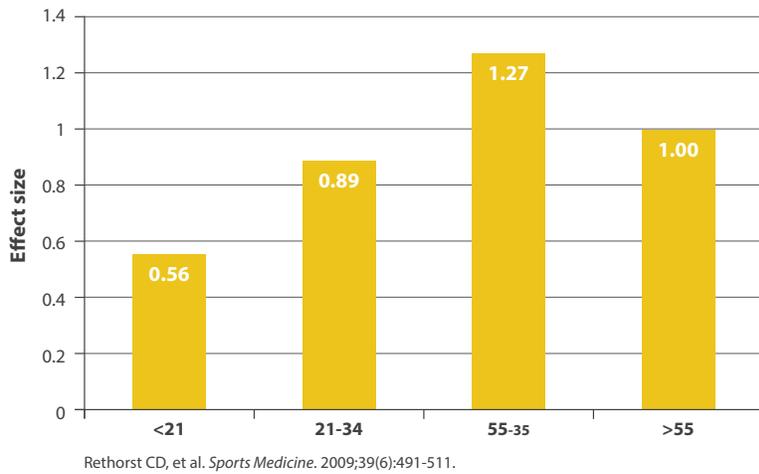
#### A Quick Primer on Effect Sizes

$$\text{Effect size} = \frac{\text{mean of one population} - \text{mean of another population}}{\text{standard deviation}}$$



An effect size simply tells us how effective an intervention is – how well does it work?

### Age and Effects on Depression



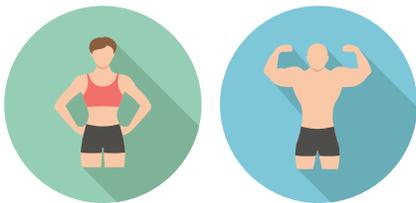
To the left you see that exercise helps reduce depression in individuals of ALL age groups! Young and old benefit from exercise and its effects on mood.

We know this is a lot of scientific mumbo-jumbo but it's important you know we have very high levels of evidence that exercise works to reduce depression.

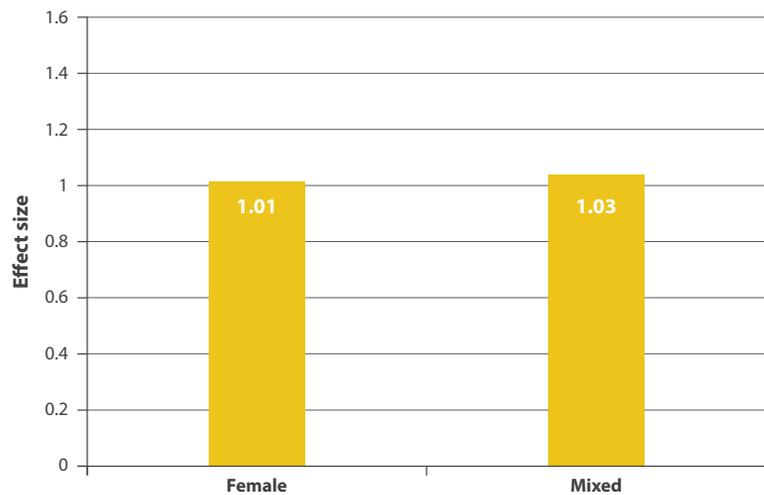


### ARE YOU CONVINCED YET? IF NOT, THEN PLEASE READ ON...

#### Male vs. Female: Exercise's Effects on Depression



Do you see that **BOTH** men and women benefit equally from exercise's ability to reduce depression? There's no sexism here! All joking aside, this is great news!

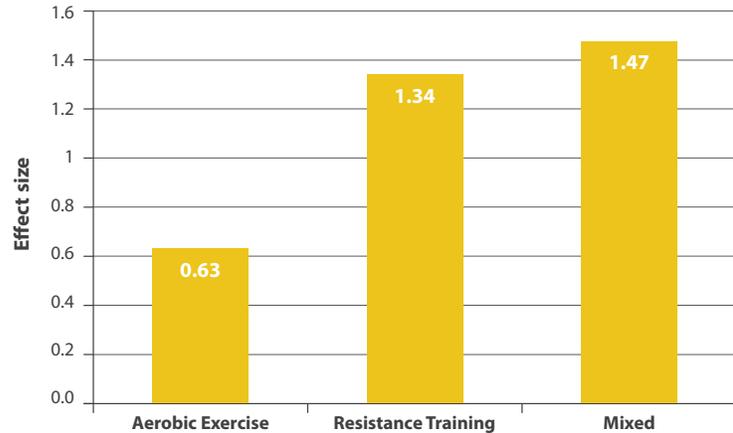


Rethorst CD, et al. *Sports Medicine* 2009. 39(6):491-511.

## Effect of Different Types of Exercise

Which kind of exercise is best when it comes to reducing symptoms of depression? The answer is, ALL of them are helpful including aerobic, weight lifting/strength training, etc.

It seems that a combination of both aerobic and weight lifting (mixed exercising) has the best results. Please keep this important fact in mind when you're planning your exercise routines.



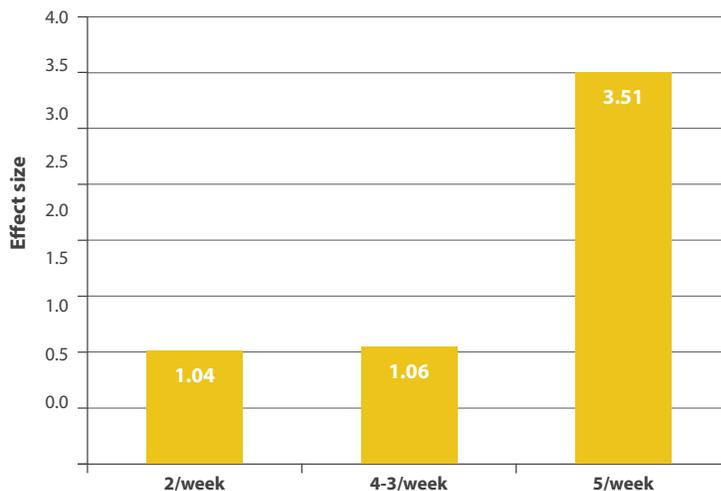
Mead GE et al. *Cochrane Database of Systemic Reviews*. 2008 Oct 8;(4:CD004366).

We'd like to introduce you to an important concept that we believe will help you as you modify your exercise routine based on this new information or if you're just starting an exercise plan. This concept is called FID and here's a great way to remember it:



IF YOU WANT TO BE FIT THEN YOU MUST **FID**

## Exercise Duration and Effects on Depression



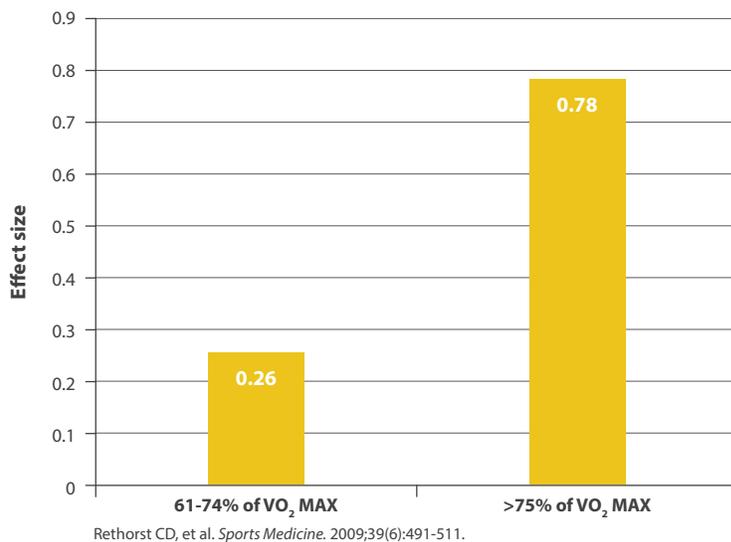
Rethorst CD, et al. *Sports Medicine*. 2009;39(6):491-511.

**"F"ID - FREQUENCY:** To get the greatest benefit from physical exercise on your mood, exercise 5 or more times a week. This may sound like a lot, especially when you're feeling down and perhaps tired and unmotivated. Remember, it's important to exercise nearly every day to get the most bang for your buck. Do your very best to exercise no matter how you're feeling!

SO NOW THAT YOU KNOW ABOUT FREQUENCY,  
LET'S TURN OUR ATTENTION TO INTENSITY AND DURATION



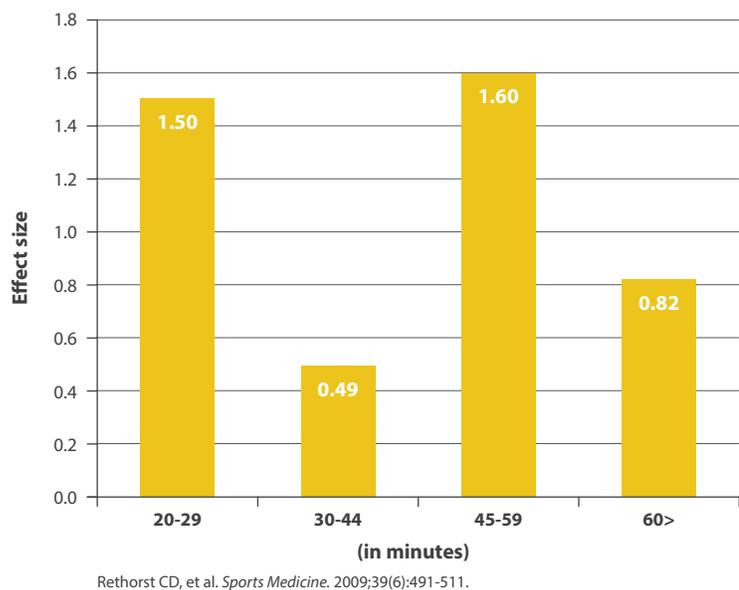
### Exercise Duration and Effects on Depression



**F“I”D - INTENSITY:** Be sure to talk to your healthcare provider about your degree of intensity before starting your exercise plan. Intensity means how hard you are exercising. The data tells us that when we exercise with greater intensity (exercise harder), it has a greater positive effect on mood. Please don't ignore the intensity of your exercise – it really seems to make a big difference on how well the exercise works on your mood.

### Exercise Intensity's Effect on Anti-depressant Response

**F“I”D” - DURATION:** As you can see to the right, even short bursts of exercise (between 20-29 minutes) result in an impressive effect size of 1.5. Remember an effect size of 0.8 is considered large. For exercise to have an impact on mood doesn't require a person to exercise compulsively for extended periods of time. Isn't this great news for those of us that don't like to exercise for long periods of time?



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# There's More Good News! Please, Keep Reading...



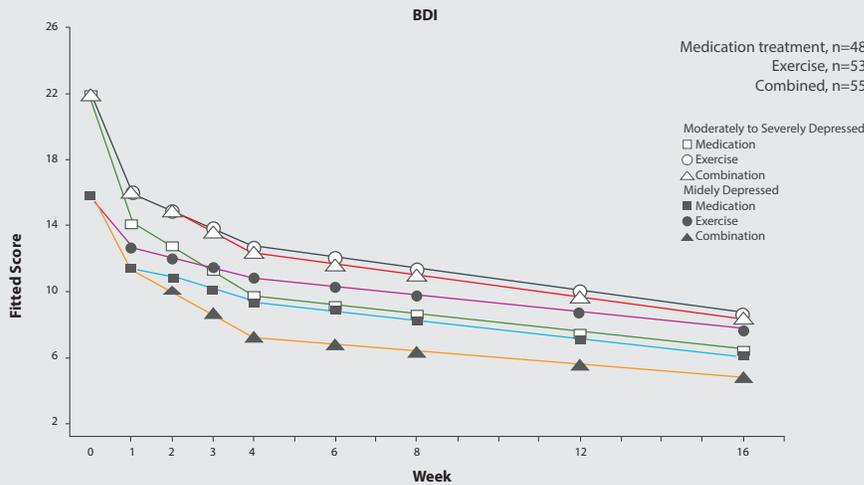
Don't get bogged down by the data. We've included it to show you there's plenty of scientific studies supporting that physical exercise is a powerful intervention when it comes to dealing with mild to moderate depression.

The two images below tell us something very important: Physical exercise appears to work for all kinds of depression – mild, moderate or severe.

It also works well in combination with anti-depressants. Exercise appears to make anti-depressants work better. Again, another win-win proposition!



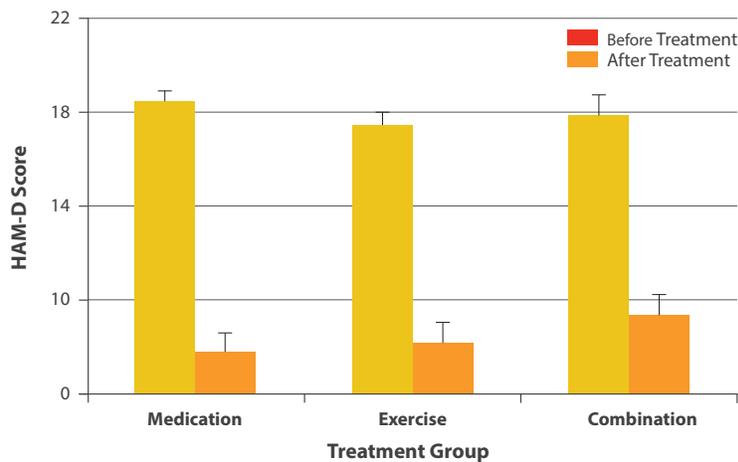
## Exercise is Helpful in both Mildly, and Moderately/Severely ill patients



Medication = sertraline  
 50-200 mg per day  
 Exercise = 3 times per  
 week, total 45 minutes, at  
 least 30 minutes at 70-85  
 % MHR

Blumenthal JA, et al. *Arch Intern Med.* 1999;159:2349-2356.

## Exercise, Medication, Compared to Combination



Medication = sertraline 50-200 mg per day  
 Exercise = 3 times per week, total 45 minutes, at least 30 minutes at 70-85% MHR

Blumenthal JA, et al. *Arch Intern Med.* 1999;159:2349-2356.

Medication treatment, n=48  
 Exercise, n=53  
 Combined, n=55

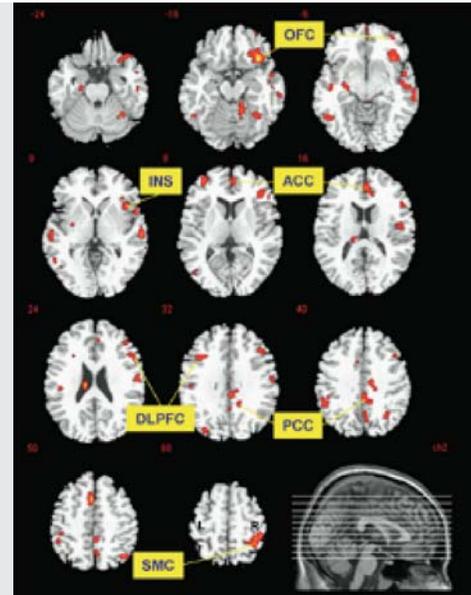
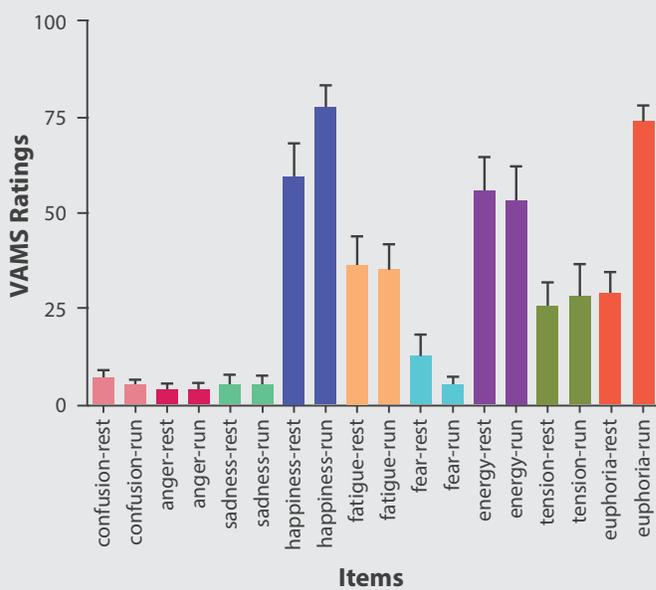


## TAMING DEPRESSION AND IMPROVING WELLNESS WITH EXERCISE

We aren't done quite yet! The two images below have more to tell us. Physical exercise not only reduces depression, it actually helps us experience strong positive emotions like happiness, pleasure, joy, etc.

When struggling with depression, imagine being able to exercise and counter those negative feelings with positive feelings? Not a bad deal, right? We encourage you to give it a try and see if exercise makes you feel better.

## Endogenous Opioids & Exercise ("Runner's High")

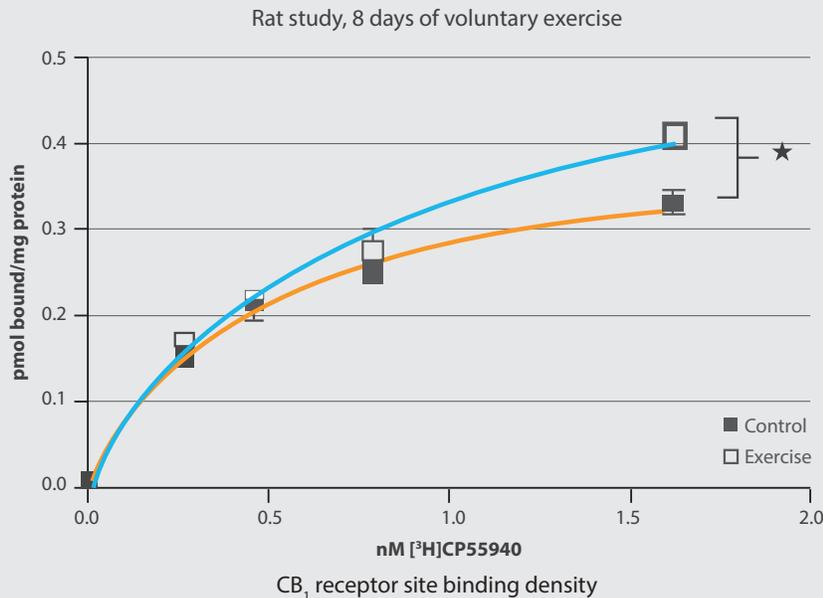


VAS Scores before and after exercise.  
Euphoria and Happiness were significantly different ( $p < .05$ )

Reduction opioid receptor availability after exercise (red is  $p < .05$ )

Boecker H et al. *Cerebral Cortex*. 2008;18:2523-2531.

## Exercise Augments Endo-Cannabinoid Signaling



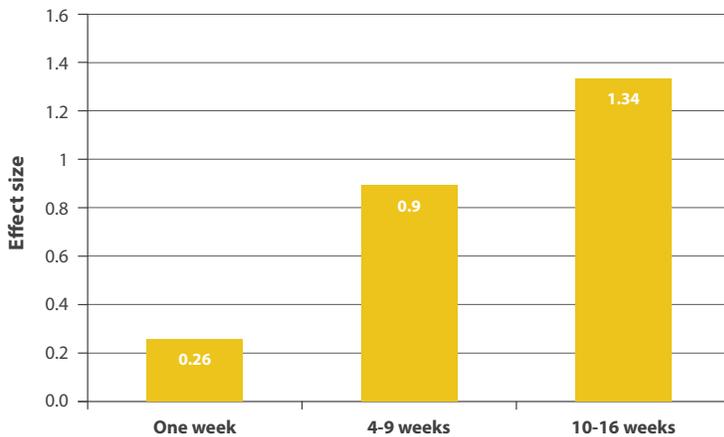
Hill MN, et al. *Hippocampus* 2009; ahead of publication.

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## How Well Does Physical Exercise Work For Depression?



### Exercise Duration (in weeks) and Effects on Depression



Rethorst CD, et al. *Sports Medicine*. 2009;39(6):491-511.



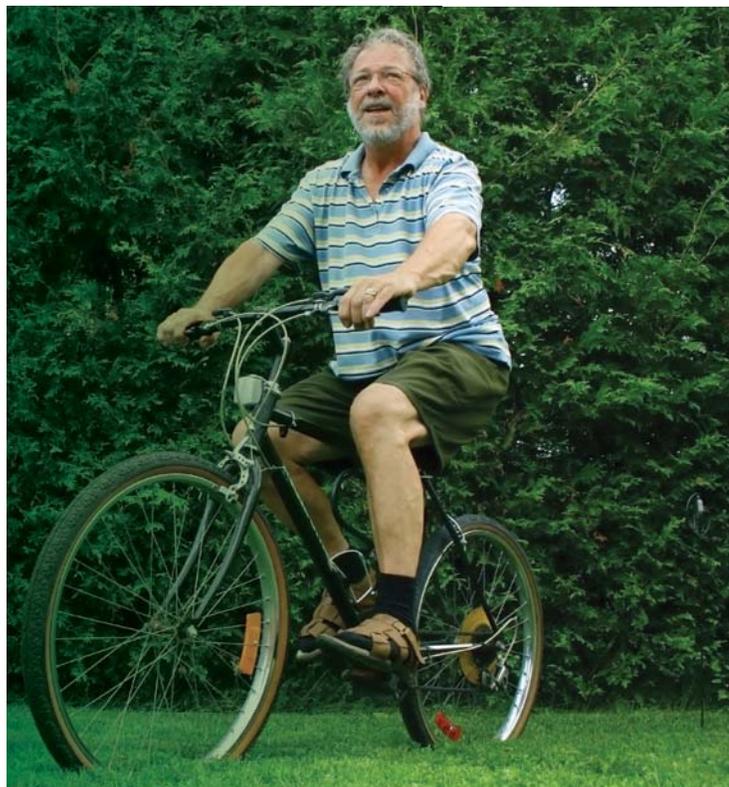
The benefits of physical exercise on depression continue to increase the longer we exercise. Exercise appears to be a great investment!

## Let's Now Turn Our Attention To Some Practical Tips & Information



### Here are a couple of common questions about exercise:

1. Which exercise is best - aerobic exercise (i.e. bike riding) or resistance training (i.e. weight lifting)? The simple answer is: BOTH! It's always better and less boring to mix up your exercise routine. The same old routine, day in and day out, becomes boring and difficult to sustain. So mix it up a little and try different things. We think you'll be pleased with the results.
2. What is the right 'dose' of exercise for the treatment of depression? If you prefer walking, then we have some specific information that we think you'll really like. The right 'dose' appears to be 14 miles of walking per week. Sounds like a lot but when you break it down, it's only 30 minutes of brisk walking per day (2 miles per day @ 4 miles/hour speed). This is a cardio protective AND mood benefitting dose of exercise.



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# Here's An Exercise And Mood Log To Track Your Successes



## EXERCISE LOG

My Goals for the week:

Mood Scale:  
 1 2 3 4 5 6 7 8 9 10  
 Not Depressed Very Depressed

PLEASE RATE YOUR MOOD BEFORE AND AFTER EXERCISE BY CIRCLING THE APPROPRIATE NUMBER BELOW

<b>MON</b> Date: _____	Activity: _____ MOOD Before: 1 2 3 4 5 6 7 8 9 10	Duration: _____ After: 1 2 3 4 5 6 7 8 9 10
<b>TUE</b> Date: _____	Activity: _____ MOOD Before: 1 2 3 4 5 6 7 8 9 10	Duration: _____ After: 1 2 3 4 5 6 7 8 9 10
<b>WED</b> Date: _____	Activity: _____ MOOD Before: 1 2 3 4 5 6 7 8 9 10	Duration: _____ After: 1 2 3 4 5 6 7 8 9 10
<b>THU</b> Date: _____	Activity: _____ MOOD Before: 1 2 3 4 5 6 7 8 9 10	Duration: _____ After: 1 2 3 4 5 6 7 8 9 10
<b>FRI</b> Date: _____	Activity: _____ MOOD Before: 1 2 3 4 5 6 7 8 9 10	Duration: _____ After: 1 2 3 4 5 6 7 8 9 10
<b>SAT</b> Date: _____	Activity: _____ MOOD Before: 1 2 3 4 5 6 7 8 9 10	Duration: _____ After: 1 2 3 4 5 6 7 8 9 10
<b>SUN</b> Date: _____	Activity: _____ MOOD Before: 1 2 3 4 5 6 7 8 9 10	Duration: _____ After: 1 2 3 4 5 6 7 8 9 10

Inspiring quote for the week:

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## TRACKING YOUR MAXIMUM HEART RATE IS SUPER IMPORTANT



In order to get the most out of your exercise, it's important to know your Maximum Heart Rate (MHR). It is thought that if you exercise at 65% or greater of your MHR per minute, then you'll get the most benefit. Don't you want to get the most bang for your buck in terms of exercising? Of course you do! So, let's learn how to calculate our MHR!

Subtract your age from 220. That's it – that's how you calculate your MHR! As an example, if you're 50 years old, then your MHR is  $220 - 50$ , which is 170. When you exercise, the goal is to keep your heart rate at 65% of 170 (110) or higher while you're exercising.

Please take a moment and calculate and document your MHR below:

My Maximum Heart Rate \_\_\_\_\_

65% Of My Maximum Heart Rate \_\_\_\_\_

## EXERCISE PRESCRIPTION

Please discuss with your healthcare provider

1- I agree to exercise the following number of times per week (please circle one option below)

1/week    2/week    3/week    4/week    5/week    6/week    7/week

2- I agree to the following type of exercise (please circle one option below)

Aerobic Exercising    Weight Lifting /Resistance Training    Mixed (both)

3- I agree to the following minimum number of minutes of exercise each day I exercise

(please circle one option below)

less than 15 minutes  
15-20 minutes  
20-30 minutes  
30-45 minutes  
45 minutes - 1 hour  
greater than 1 hour

## MY ACTION PLAN

Please discuss action plan with your healthcare provider



### 1. Assessment of my current exercise practices:

### 2. List three reasons exercise is important to overall physical and mental health:

### 3. Roadblocks to exercising:

### 4. To be FIT, I must FID. What are the three elements of FID:

### 5. My plan to develop an effective exercise plan:



“Physical fitness is not only one of the most important keys to a healthy body, it is the basis of dynamic and creative intellectual activity.”  
**John F. Kennedy**



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