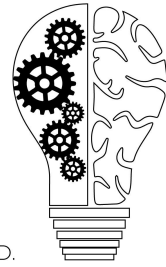


## Episode 096: *The Best Exercise Program for Depression*

Kyle Logan, B.S., Maddison Ulrich, B.S., Matthew Hagele, M.A.,  
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**PSYCHIATRY &  
PSYCHOTHERAPY**

This PDF is a supplement to the podcast “Psychiatry & Psychotherapy” found on [iTunes](#), [Google Play](#), [Stitcher](#), [Overcast](#), [PlayerFM](#), [PodBean](#), [TuneIn](#), [Podtail](#), [Blubrry](#), [Podfanatic](#)

There are no conflicts of interest for this episode.

In this episode, we review studies on strength training, exercise, and depression from the last 2 years. It is well known that any form of exercise is beneficial for people with depressive symptoms, with strength training being most effective. Strength training can be both a treatment for patients with depression and a protective mechanism against the onset of depression.

We also specifically discuss aerobic training versus high-intensity interval training. These topics of exercise and mental health are gaining momentum in the scientific literature, but how can we implement this data in our clinical practice? What is the simplest, most effective way to do this?

To help us answer these questions, we are joined by guest [Matt Reynolds](#), who has over 20 years of experience in strength training and coaching. Matt first totaled “elite” in powerlifting in 2004, won his title of Professional Strongman in 2006, and founded one of the largest pure-strength gyms in the country, STRONG Gym. (For those wondering what ‘elite powerlifter’ means, it is when the total maximum weight of your 1 repetition of squat, deadlift, and bench press put you in the top 10 of people in your respective weight class.)

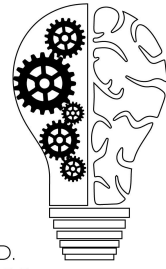
### **Strength training: the best exercise practice**

Before we dive into Matt Reynolds’ vast strength training expertise, we need to understand the data supporting strength training and nuances within this broader category. We begin with a basic correlation between increasing strength and decreasing depression. We will also look at the most effective types of aerobic training for improving depressive symptoms.

*Increasing strength has the biggest impact on depression*

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A large meta-analysis of 33 randomized controlled trials involving 1877 patients showed that resistance exercise training significantly reduced their depressive symptoms, with a mean effect size of 0.66. The number needed to treat for 1 patient to enter remission was 4 ([Gordon, 2018](#)).

A meta-analysis of 27 randomized controlled trials involving 1,452 clinically depressed adults revealed that strength training decreased depressive symptoms more than endurance training did, with a standard mean difference of -0.96 for strength training and -0.52 for endurance training. Endurance training lasting longer than 10 minutes increased the effect size to -0.62 ([Nebiker, 2018](#)).

A randomized controlled crossover trial of 68 youth (15-25 years old) with major depressive disorder (MDD) were assigned to multimodal exercise of resistance training and high-intensity interval training for 12 weeks. No significant association between strength/aerobic exercise attendance and change in depression severity was observed, but there was a dose-dependent inverse relationship between bench press repetitions and depression severity with an effect size of -0.51 ([Nasstasia, 2019](#)).

In a cohort study involving 6,392 adult Chinese participants, the incidence of depressive symptoms was higher in populations with lower handgrip strength. In this cohort study the incidence of depression was 11.9%, 15.5%, and 22.1% in the strong, moderate, and weak handgrip strength group, respectively. This is a consistent finding across countries. The same authors performed a meta-analysis of 6 prospective studies involving 26,473 participants and found a significantly decreased risk of depression symptoms among participants with strong handgrip strength (RR=0.74) ([Ying, 2019](#)).

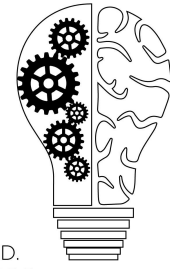
### *HIIT is better than moderate continuous training*

A randomized controlled trial of 59 in-patients with MDD found that sprint interval training was comparable to continuous aerobic training on reducing depressive symptoms, with a large effect size of 1.1. This study also found that improvements in maximum oxygen uptake were predictive of improvements in depressive symptoms. The net time of sprint interval training was 12.5 minutes compared to 20 minutes of continuous aerobic training ([Minghetti, 2018](#)).

A systematic review and meta-analysis examined 9 articles on HIIT for people with severe mental illness. 7 studies found a significant improvement in mood ( $g = 0.641$ ) following HIIT. Of the studies examined, 4 randomized controlled trials compared HIIT to moderate continuous

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training, and found that HIIT improved depressed mood more than moderate continuous training ([Korman, 2019](#)).

A randomized controlled trial of 34 in-patients with MDD, comparing HIIT to moderate continuous training on depression severity and arterial stiffness, showed that HIIT (SMD = 1.48) reduced depression severity more effectively than moderate continuous training (SMD = 1.40), while moderate continuous training was more effective in lowering peripheral arterial stiffness ([Hanssen, 2018](#)).

A systematic review and meta-analysis of 12 interventional studies found HIIT reduced depression severity using pre-post measurements with a significant effect size SMD = -1.36,  $p < 0.0001$  ([Martland, 2019](#)).

### *HIIT and strength training is the best combo*

A large population study of 17,839 adults found that the combination of aerobic and muscle-strengthening exercise was associated with the lowest likelihood of reporting depressive symptoms, followed by aerobic exercise only and muscle strengthening only. Prevalence ratios were 0.26-0.54, 0.36-0.62, and 0.49-0.84 respectively ([Bennie, 2019](#)).

A meta analysis of 17 studies revealed that strength training and combined aerobic/strength training increases peripheral blood brain-derived neurotrophic factor concentrations in older adults ( $Z=2.94$ ,  $P=0.003$ ,  $Z=3.03$ ,  $P=0.002$ , respectively), while low-to-moderate aerobic exercise alone does not ( $Z=0.82$ ,  $P=0.41$ ) ([Marinus 2019](#)).

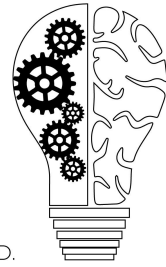
A cross sectional study of 5180 Australian women found that a combination of resistance training and aerobic exercise yielded lower probabilities for depression (RRR=0.61 [0.43-0.86]) than aerobic exercise alone ([Oftedal 2019](#)).

### Strength and exercise as an antidepressant

Exercise, particularly strength training, has large effect sizes comparable to antidepressant medication (Blumenthal, 2007). Patients with MDD can be 2-3 standard deviations from the norm and still suffer, even while on antidepressants. We can tell patients with confidence that by getting stronger they will be less likely to have this level of suffering in their lives.

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### Today's fitness marketplace

Starting a strength training program can be intimidating. Patients can walk into a big-box gym and be confronted with exercise machines packed wall-to-wall with 100s of exercise options available. Finding an exercise program is a challenge and the internet is full of complicated training programs. In this podcast we emphasize a strength program regimen that is focused on training for health and improving quality of life.

It is important for psychiatrists and therapists to provide patients with specific resources, like exercise programs or referrals to personal coaches, to make it easier for them to implement these recommended changes. Get to know a good coach in your area and choose an exercise regimen (like the one we provide) that you feel confident providing to your patients.

### The best way to get strong

We want strength training that is simple, so Matt Reynolds has provided selection criteria when it comes to picking exercises. Pick the exercise that:

1. uses the most muscle mass possible and
2. that trains over the greatest effective range of motion

Moving through a joint's range of motion is healthy for the joint and good for mobility and flexibility. This simple criteria leaves us with the [squat](#), [deadlift](#), [overhead press](#), and [bench press](#) (proper technique for these exercises is on the [Barbell Logic YouTube channel](#)).

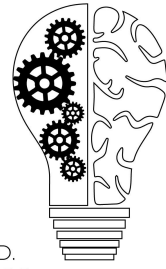
Executing an exercise with the proper technique is an ongoing challenge that will be refined in every workout. If a patient is struggling with form they should work with a coach to perform the technique correctly, as strength training incorrectly can cause injuries. And don't forget: always warm up before exercising.

Beginning a program should not be psychologically stressful or too physically demanding. Strength training exposes the body to a stress it is not used to, then allows a recovery period for adaptation to occur. For an untrained adult, simply doing a set of 5 squats would qualify as a stress the person is not used to.

The key to beginning a training program is *progression and consistency*. An example of progression with squats is starting with 3 sets of 5 repetitions (reps) with just the olympic bar (45lbs). At the next workout, add 5 pounds and do 3 sets of 5 reps with that 50lbs. You continue

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to add 5lbs at every workout. With this system, if squats are performed 3x per week and 5lbs is added every time, then in a month 60lbs will be added to the bar. This simple concept will eventually result in substantial strength gains. Younger adults can train up to 3x per week, but older adults (age 65 or more) should not train more than 2x per week (squatting 2x per week is sufficient for making substantial gains).

Matt Reynolds believes in the “minimum effective dose” and thinks this is around 3 sets for 5 reps each. An appropriate amount of rest time between sets is 3-4 minutes. Depending on where you are in your fitness journey this might not seem like a lot of sets, but Matt has gotten countless clients very strong using this training program. Record the date, exercises, weight, sets and reps of every workout. Below is an example of progression that you can use or recommend:

9/18/2020

Squat 45lbs 3 sets of 5 reps

Deadlift 55lbs 1 set of 5 reps (Deadlift is unique in that it only requires 1 set to make a sufficient stress to cause an adaptation)

Press 20 lbs 3 sets of 5 reps

9/20/2020

Squat 50lbs 3 sets of 5 reps

Deadlift 60lb 1 set of 5 reps

Bench 45lbs 3 sets of 5 reps

9/22/2020

Squat 55lbs 3 sets of 5 reps

Deadlift 65lbs 1 set of 5 reps

Press 25 lbs 3 sets of 5 reps

9/24/2020

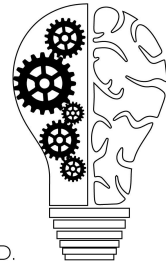
Squat 60lbs 3 sets of 5 reps

Deadlift 70lb 1 set of 5 reps

Bench 50lbs 3 sets of 5 reps

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### **Patient examples**

The stress adaptation concept will have to be applied to each individual patient. Some patients will not begin by putting a barbell on their back and squat. The stress must be appropriate for the patient's level of strength.

For example, a patient discharged after a long hospital stay with sarcopenia relying on a wheelchair. This patient's stress will likely be assisted squats out of the wheelchair. An example routine could be to have the patient perform assisted squats for 2 reps, rest 5 minutes, and repeat this 2 more times, progress over time to unassisted squats, then to high reps.

One of Matt's favorite stories is of a 79 year old female client. She had a two-story house and hadn't been up the stairs in years. She had two hip replacements and was struggling just to use the toilet. Matt started by having her stand up out of a kitchen chair and progressed over the next 5 years to deadlift 155lbs sets of 5 at 84 years old. She became completely independent and had no problems getting around the grocery store, and even bought a new sports car. This is a great example of progression and consistency. This example breaks the myth that you can't get stronger at an older age.

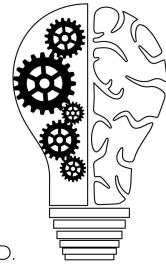
Another example is a patient who used to squat heavy weights years ago but has not for many years. His regimen would begin with 30% of what he used to squat and only go up 5lbs every session (this early stage is also a good time to make sure the patient is getting full depth in the squatting motion). The patient might want to add too much weight at once, but it's not worth the risk. His body will still adapt to smaller increments of additional weight.

### **Rate of injury among weightlifters vs. other sports**

In a systematic review in 2017, the risk of injury in weightlifting was 2.4-3.3 injuries/1000 hours of training and 1.0-4.4 injuries/1000 hours of training in powerlifting, which is comparable to other non-contact sports. The risk of injury in weightlifting and powerlifting is considerably less than contact sports, such as football, which has 9.6 injuries/1000 hours of training ([Aasa, 2017](#)). Competitive soccer has a risk of injury of 53 injuries /1000 hours of training ([Rahnama, 2002](#)).

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### **Strength training effects on the body**

#### *Brain-derived neurotrophic factor:*

Brain-derived neurotrophic factor (BDNF) is crucial to axonal growth, synaptic plasticity, and neuronal repair, and it is decreased in patients with MDD. Depression treatments such as selective serotonin reuptake inhibitors, serotonin-norepinephrine reuptake inhibitors, tricyclic antidepressants, and electroconvulsive therapy increase peripheral BDNF. A meta-analysis in 2017 of 20 studies found that selective serotonin reuptake inhibitors increased peripheral BDNF with an effect size of 0.71 when comparing levels before and after 8 weeks of treatment ([Zhou, 2017](#)).

There is evidence that HIIT increases BDNF in animal and human studies. Animal studies have shown short and long term increases in BDNF following HIIT when compared to levels after continuous training. Human studies examining peripheral BDNF have also found evidence of both short and long term increases associated with HIIT ([Jiménez-Maldonado, 2018](#)).

#### *Bone health:*

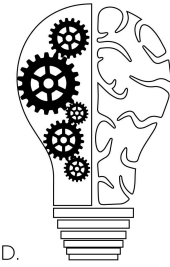
Resistance training is beneficial for any gender and any age group. Bi-weekly resistance training done over a year showed either maintained or increased bone mineral density in postmenopausal women. When resistance training is combined with weight-bearing impact aerobic exercise such as jogging, bone mineral density is maintained or increased in both older women and men ([Hong, 2018](#)).

#### *Sexual health:*

Resistance training has a powerful association with increased testosterone and improved sexual function. Its effect on sexual health and performance was demonstrated recently in a 2017 meta-analysis on patients with prostate cancer undergoing androgen deprivation therapy. Groups using resistance training showed less decline in sexual desire and erectile dysfunction compared to control groups ([Yunfeng, 2017](#)). Another recent study showed an association between fitness and sexual health in women, with sexual arousal being predicted by levels of cardiovascular endurance ([Jiannie, 2018](#)). A study in the International Journal of Sports Medicine demonstrated that one strength training workout can raise testosterone in young adults and elderly adults with ( $p < 0.5$ ) in the young adults and no significant differences between the groups ([Smilios, 2006](#)).

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### *Cardiovascular health and weight loss:*

A meta-analysis comparing aerobic training alone and combined aerobic and resistance training in patients with coronary artery disease found combined training superior in decreasing body fat percentage, increasing fat-free mass, and increasing VO<sub>2</sub>max compared to aerobic training alone ([Marzolini, 2020](#)).

### *Diabetes prevention:*

Diabetes prevalence has more than doubled since 1980 with 153 million cases increasing to more than 400 million in 2015 according to the World Health Organization. Type 2 diabetes mellitus is characterized by mitochondrial dysfunction and insulin resistance leading to hyperglycemia. It is well known that resistance training combats metabolic dysfunction in obese patients with type 2 diabetes mellitus by increasing insulin sensitivity. Resistance training also has evidence of protective effects against type 2 diabetes mellitus. Obese patients ( $\geq 30$ BMI) who engaged in 150 minutes or more of resistance training per week had an estimated 60% *reduction* in risk of developing type 2 diabetes mellitus compared to their peers who engaged in less resistance training ([Strasser, 2013](#)).

## **Conclusion**

If you are a mental health provider wondering how to best use this information, consider starting your own program first to experience the process and benefits firsthand. Strength training is another important tool to help patients struggling with depression. A strength training program can be simple, but it requires hard work. Convincing a patient to follow through with exercise recommendations may take 4-5 sessions of discussion. However, this sustained effort will reap significant rewards in the patient's well-being and mental health.

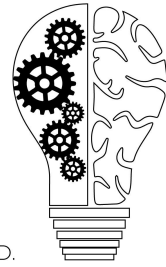
### Main Take Away Points

- Increased strength has a dose-dependent relationship with improved depression severity
- HIIT is more effective at improving depression than continuous aerobic training
- Combined strength training and aerobic training is the best program for treating depression
- The best exercises are those that train the most muscle mass and the most joints over the most range of motion
- Begin a strength training program with the smallest stress possible and gradually increase the intensity



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- Competitive powerlifting is around 20x safer than competitive soccer (but we are not recommending doing something as risky as competitive powerlifting)
- Patients can begin a strength training program at any age

Dr. David Puder is not receiving any kind of compensation, financial or otherwise, from Barbell Logic or the authors of the book discussed in the podcast.

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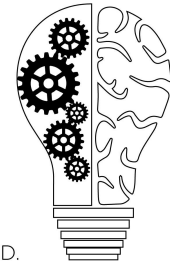
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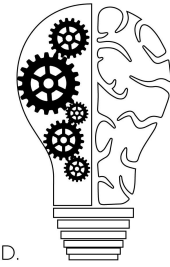
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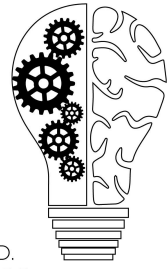
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