An analysis of data from the National Comorbidity Survey, a nationally representative sample of persons aged 15 to 54 years (N = 8098), suggests that those who exercise regularly are less likely to report being depressed or having an anxiety disorder. The association between regular physical activity and lower prevalence of major depression (odds ratio [OR], 0.75) is fairly specific. Dysthymia, for example, was only minimally responsive to exercise, and there was no correlation between regular exercise and reduced risk of bipolar disorder. Psychotic disorders and substance abuse also were not substantially affected by regular physical activity. However, certain anxiety disorders, particularly panic attacks and phobias, were found to be less prevalent among self-reported exercisers.

Aerobic exercise, in the amount recommended by consensus public health recommendations (ie, 30 minutes per day, at least 5 days per week), is effective in relieving symptoms of mild to moderate major depressive disorder. In a study, 80 adults aged 20 to 45 years in whom mild to moderate major depressive disorder was diagnosed were randomized to 1 of 4 aerobic exercise groups. The primary outcome was the patient’s score on the 17-item Hamilton Rating Scale for Depression (HRSD-17). Scores at 12 weeks were reduced 47% from baseline for those meeting the public health recommended levels of exercise, significantly better than the 30% reduction seen for lower-level exercisers and 29% for controls. Although the evidence for the short-term effectiveness of exercise in relieving symptoms of anxiety and depression is convincing, the longer-term effect is less clear. A just-released study by researchers in Caerphilly, South Wales, followed middle-aged men for up to 10 years. Of the 1158 men for whom there were complete data, those who participated in heavy-intensity leisure-time activity had reduced odds of anxiety and depression after 5 years (OR, 0.61), but no such association was seen at a 10-year follow-up. Similarly, men working at the most physically demanding jobs had reduced odds of anxiety and depression after 5 years, but no such reduction was seen at 10 years.

Exercise as Treatment for Depression

One would think that such a safe, inexpensive clinical intervention—with no stigma attached—that improves symptoms of major depression would catch on like wildfire. Yet, that is not the case. Even with the new warnings about certain risks associated with antidepressant use, it is far easier to convince patients to take medication or try psychotherapy than to start a modest exercise regimen. Nor does the choice need to be made between the various helpful treatments. One particularly interesting approach is to incorporate exercise as an augmentation strategy in the treatment of persons with major depression. In a pilot study, 17 patients with incomplete remission of depressive symptoms began a 12-week exercise program while continuing their antidepressant medication (unchanged in type and dose). Individual exercise programs were calculated according to public health guidelines. Intent-to-treat analyses showed significant improvement in scores on the HRSD-17 (P < .008) and the Inventory of Depressive Symptomatology Self-Report (IDS-SR-30) (P < .002). For patients who completed the study (n = 8), dramatic improvement was seen in both HRSD-17 and IDS-SR-30 scores (increases of 10.4 points and 18.8 points, respectively).
Mechanisms of Action
One possible mechanism whereby exercise alleviates depressive symptoms involves the idea of an adaptable and ever-changing brain. Human imaging studies show that major depression correlates with decreased hippocampal volume; the magnitude of the change in hippocampal volume is directly proportional to the length of illness.\(^5\) Up to a 19% loss in hippocampal volume may occur in persons with severe, untreated depression.\(^6\)

Among persons who exercise and are treated with antidepressants, one sees the opposite—hippocampal volume increase. In this context, it is interesting that (at least in rodents) exercise increases levels of brain-derived neurotrophic factor (BDNF) in the hippocampus and cerebral cortex. Associated with this up-regulation of BDNF and other neurotrophic factors, exercise increases neurogenesis in the hippocampus in a manner similar to what is seen with antidepressant treatment.\(^7\) Endurance training (in animal models) increases cortical capillary supplies, number of synaptic connections, and development of new neurons.\(^8\)

There is also the likelihood that exercise is effective in depression because it alleviates stress. The famous “fight or flight” response can be elicited by emotional stimuli, work challenges, or social stress. Although very useful in a hunter-gatherer society, the stress-related energy mobilization is not as easily discharged in the modern world. The resultant chronic hypercorticalism and hyperinsulinemia lead to metabolic disturbances and adverse effects on the brain (including hippocampal atrophy). In rodents, chronic stress decreases levels of BDNF in the hippocampus.\(^9\)

Assuming that the stress response is a neuroendocrine mechanism that occurs in anticipation of physical action, physical activity is a natural means to prevent the adverse consequences of stress.\(^10\) Indeed, the 24-hour excretions of cortisol and epinephrine in urine were decreased in adolescent girls with depressive symptoms randomly exposed to 8 weeks of group exercise for 50 minutes per day 5 days per week (as compared with controls).

Conclusion
Whatever the mechanism at work, either acting directly on the brain via the endocrine system or simply psychological (improved body image, temporary distraction from real-world concerns, etc), the message is clear. All of us would benefit from some time spent exercising in the gym or elsewhere, but persons with major depression have extra reason to exercise regularly.

References:


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