EXERCISE TRAINING
AS AN ALTERNATIVE TREATMENT
FOR DEPRESSION AMONG OLDER ADULTS
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This article reviews the current literature related to exercise treatment and depression among older adults. Results from investigational studies support the antidepressive effects of exercise programs. Aerobic exercise is more effective than placebo or no treatment controls, and appears to be as effective as more traditional treatment methods. However, a number of potential methodological problems leave the issue of exercise therapy for the treatment of depression unsettled. Some possible directions for future research are discussed, along with clinical recommendations. (Altern Ther Health Med. 1998;4(1):48-56)

The detection and treatment of depression among the elderly is an important clinical and public health concern. In fact, depression is one of the primary health problems currently faced by the elderly. According to the Epidemiologic Catchment Area Study, depressive symptoms occur in approximately 15% of the elderly population, and rates are even higher for elderly in nursing homes. Depressive illness among the elderly is responsible for more hospitalizations than is any other disorder except cardiovascular disease, and leads to decreased functioning, increased morbidity and mortality, increased use of healthcare resources, and institutionalization. Given the impact of depression on quality of life, health outcomes, and society as a whole, the identification of effective strategies for the prevention and treatment of depression among the elderly is needed.

DEPRESSIVE SYMPTOMS

Depression is characterized by a core group of signs and symptoms including despondent mood, loss of interest in usual activities, weight loss or gain, difficulty sleeping, low energy, a state of worthlessness, a diminished ability to think or concentrate, and suicidal ideation. Older people are especially vulnerable to depressive grief reactions, because they tend to suffer more frequent losses than do individuals at other periods of life. In fact, aging is associated with numerous losses: diminished physical health; loss of spouse and friends; and reduced financial, social, and employment status. Failure to recognize and treat depression in later life may lead to decreased quality of life, social isolation, and increased mortality among those affected.

Depression also may increase vulnerability to other diseases. For example, Frasure-Smith et al reported that major depression occurred in 18% of postmyocardial infarction survivors, which was associated with a three- to fourfold increase in risk for mortality compared with nondepressed individuals. This finding suggests that interventions directed toward postmyocardial infarction patients who show signs of major depression during hospitalization could significantly reduce mortality.

TREATMENT INTERVENTIONS

Various therapeutic interventions have been developed for the treatment of depression, including pharmacotherapy, psychotherapy, and—in highly resistant cases—electroconvulsive therapy. Depression also has been treated with antidepressive medication. Selective serotonin reuptake inhibitors have been used to treat depression among older patients. These drugs have several clear advantages over other classes of antidepressants for management of depression; most importantly, they have fewer myocardial and central nervous system effects characteristic of tricyclic antidepressants.

Numerous studies have investigated the efficacy of standardized, short-term psychotherapeutic treatments for outpatient depression. Some of the best known of these treatment approaches are cognitive behavior therapy and interpersonal therapy, which have been shown to effectively reduce depression in those diagnosed with major depressive disorder. For example, in a 16-week intervention study, Shea et al examined the course of depressive symptoms for outpatients with major depression,
randomizing them to cognitive behavior therapy, interpersonal therapy, antidepressive medication plus clinical management, or placebo plus clinical management. Based on follow-ups at 6, 12, and 18 months, no significant differences were found among the four treatment conditions. However, for the subsample of patients who were less depressed at baseline, the two psychotherapy conditions seemed to produce a slightly better outcome.

Although effective, both pharmacotherapy and psychotherapy treatment interventions are often expensive and time consuming. Based on 1980 data, office-based psychiatrists’ and psychologists’ costs were $453 million, pharmaceutical costs were $138 million, and the cost of home and institutional care was $141 million. With the escalating costs of treating depression, there is a need to identify more cost-effective strategies that can be implemented in large segments of the population, which could have the potential to prevent or lessen the severity of depression. In recent years, exercise has been suggested as one of these strategies to improve mental as well as physical health. For the purposes of this review, “exercise” is defined as physical activity that is repetitive, structured, and designed to improve or maintain physical fitness.

EXERCISE AND DEPRESSION

A considerable amount of research has focused on the mental health benefits associated with participation in regular exercise, perhaps because exercise has a number of potential advantages over more traditional treatment therapies: it is relatively inexpensive, may be adopted by most anyone, and generally has fewer side effects than do most medications.

The purpose of this article is to consider the scientific evidence relating physical activity to relief of depression—specifically among older adults. The literature concerning the relationship between exercise and depression previously has been reviewed. Despite a host of design limitations characterizing much research in this area, researchers have generally suggested that aerobic exercise has beneficial effects for those suffering from depression.

Correlational Studies of Exercise and Depression

Several epidemiological studies have reported an association between physical activity and depressive symptoms among elderly samples. In a cross-sectional study by Chodzko-Zajko, high scores on the depression scale were found to be associated with low scores on the Index of Physiological Status. Parent and Whall also found that older adults who participated in physical activity demonstrated a lower depression score than did older adults who did not. Findings in these studies are generally consistent with larger population studies, which suggest a moderate, inverse relationship between physical activity and symptoms of depression.

Although these correlational studies demonstrate an association between mental health and levels of physical activity, they are limited because causal inferences cannot be made. With correlational designs, it is impossible to determine whether patients are depressed because they are inactive or inactive because they are depressed. Results of experimental studies must be examined to determine whether exercise is a viable alternative therapy.
treatment for depression and, if it is, to identify the mechanisms by which exercise contributes to its therapeutic effect.

**Experimental Studies of Exercise and Depression**

*Healthy samples.* Numerous researchers have examined exercise and psychological mood states among nondepressed elderly populations. Reviewers have noted that there is insufficient experimental evidence to conclude that exercise leads to improvements in depressive symptoms. Emery and Gatz reported little change in psychological well-being in a randomized design in which 48 older men and women were assigned to either a 12-week aerobic exercise program, a social activity group, or a wait-list group. Blumenthal et al employed a randomized design in which 101 older adults were assigned to either a 16-week aerobic exercise group, a yoga group, or a wait-list control group. Results indicated that scores on the Center for Epidemiological Studies Depression scale decreased significantly only in men in the aerobic group. The authors reported that, despite relatively few improvements on standard psychometric scales, subjects reported that they were less anxious, less depressed, had more energy, and expressed better life satisfaction. It was concluded that subjects' perceptions may be more sensitive measures of mood change than standard psychometric tests, particularly in a healthy, nondepressed population.

*Clinical samples.* Studies assessing changes in mood among patients with coronary heart disease also have been conducted. In a sample of postmyocardial infarction patients, Stern and Cleary reported that despite a significant increase in work capacity in men who participated in regular exercise, no differences were found in psychosocial outcomes compared with a control group that did not exercise. Mayou also failed to observe differences in either work capacity or psychological symptoms between exercising postmyocardial infarction patients and a standard treatment and advice group. In general, most of these studies showed few consistent improvements in any aspect of psychological functioning, perhaps because many patients do not report significant psychological dysfunction before beginning an exercise program. Furthermore, most research has been conducted with healthy subjects, and the few studies with cardiac patients tend to include only young patients. The relationship between exercise and psychological functioning among older cardiac patients therefore has not been systematically examined.

Although numerous studies have examined the effects of exercise on depression, few have been conducted on depressed older adults. Consequently, the majority of experimental studies reviewed in this article concern younger adults (see Table). The only published experimental study of the effects of exercise on symptoms of depression in older adults in which subjects were selected based on elevated depression scores was conducted by McNeil and colleagues. Thirty elderly persons (mean, 73 years) who were mildly depressed (ie, scored above 12 and below 24 on the Beck Depression Inventory [BDI]) were randomly assigned to either an exercise, a social contact (placebo), or a wait-list control group. Following treatment, the exercise and social contact groups exhibited significant decreases in depression scores, whereas the waiting-list control group exhibited smaller changes. Because both the exercise and social contact groups exhibited reductions in depression, McNeil et al suggest that many of the positive effects of exercise on depression stem from the social contact that occurs in most exercise programs. However, such effects might have been seen with the administration of other placebos that did not involve an increase in social contact. Nevertheless, the results are important because they show that exercise training is associated with reductions in depression scores among elderly subjects with moderately elevated depressive symptoms.

**Exercise vs Psychotherapy**

Several studies have examined the effects of exercise training and psychotherapy in which significant reductions in depression scores occurred in treatment groups, but in which no significant differences were found between groups. One of the first experimental studies was performed by Greist et al, in which running was compared with two forms of individual psychotherapy in 28 outpatients with minor depression. No significant differences were found in treatment outcome among the various treatment groups after 12 weeks, whereas significant reductions in depression scores were found in all groups.

In a similar study, Freemont and Craighead studied 49 patients with elevated BDI scores who were randomly assigned to either cognitive therapy, aerobic exercise, or a combination. Significant reductions in depression scores were obtained in all treatment groups after 10 weeks, but no significant differences were found between the groups.

**Aerobic Exercise vs Nonaerobic Exercise**

Several studies have compared the effects of aerobic (ie, walking, jogging, bicycling) with nonaerobic (ie, muscular strength, flexibility, and relaxation) forms of exercise. According to these studies, increases in physical fitness level may not be necessary for the antidepressive effect. In other words, reductions in depression scores may be achieved by various forms of exercise, not only aerobic exercise.

One such study reported by Doyne et al compared the effectiveness of aerobic with nonaerobic exercise in the treatment of clinical depression in women. Forty women who met the criteria for major or minor depression were randomly assigned to one of three treatment groups: an 8-week running (aerobic) program, a weight lifting (anaerobic) program, or a wait-list control condition. Both exercise conditions significantly reduced depression compared with the wait-list control condition. Differences in depression scores between the two forms of exercise were not statistically significant.

In a later study, Martinsen et al compared aerobic with nonaerobic forms of exercise in 99 hospitalized patients meeting the Diagnostic and Statistical Manual, 3rd Edition Revised (DSM-III-R) criteria for major depression. Patients were randomly assigned to either aerobic (walking/jogging) or nonaerobic (muscular strength, endurance, and flexibility) exercise 3 times
Exercise Training as an Alternative Treatment for Depression

per week for 8 weeks. A significant increase was found in aerobic capacity for the aerobic condition, whereas the nonaerobic group did not change. However, both exercise conditions significantly decreased depression scores, indicating that improvement in depressive symptoms was independent of change in aerobic capacity and was not dependent on the exercise modality.

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Subjects</th>
<th>Intervention groups</th>
<th>Length of program</th>
<th>Depression measures</th>
<th>Fitness measures</th>
<th>Improved mood</th>
<th>Improved fitness</th>
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<tbody>
<tr>
<td>Brown et al54</td>
<td>101 college students</td>
<td>Jogging 3x/wk</td>
<td>10 wk</td>
<td>MMPI ZSDRS &gt; 50</td>
<td>12-minute</td>
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<td>Jogging 5x/wk</td>
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<td>Doyne et al55</td>
<td>4 female patients 19-24 y</td>
<td>Bicycle</td>
<td>6 wk</td>
<td>Research diagnostic criteria Depression adjective list</td>
<td>Treadmill</td>
<td>Yes</td>
<td>Yes</td>
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<td></td>
<td>Attention-placebo</td>
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<td>(within-subjects)</td>
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<tr>
<td>Doyne et al56</td>
<td>40 females 18-35 y</td>
<td>Running</td>
<td>8 wk</td>
<td>Research diagnostic criteria Depression adjective list</td>
<td>Treadmill</td>
<td>Yes</td>
<td>Yes, only in 2 exercise groups</td>
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<td>Weight lifting</td>
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<td>BDI</td>
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<td>Wait-list</td>
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<td>Freemont and</td>
<td>49 subjects 19-62 y</td>
<td>Running</td>
<td>10 wk</td>
<td>BDI &gt; 9 &lt; 30</td>
<td>Recovery heart rate</td>
<td>Yes, all 3 groups</td>
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<td>Craighead57</td>
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<td>CBT</td>
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<td></td>
<td>Running and CBT</td>
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<td>Greist58</td>
<td>60 outpatients</td>
<td>Running</td>
<td>12 wk</td>
<td>SCL-90 &gt; 50</td>
<td>Treadmill</td>
<td>Yes</td>
<td>Yes, only in running group</td>
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<td>test</td>
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<tr>
<td>Greist et al59</td>
<td>28 outpatients 18-30 y</td>
<td>Running</td>
<td>10 wk</td>
<td>Research diagnostic criteria SCL-90</td>
<td>None</td>
<td>Yes</td>
<td>All 3 groups</td>
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<td></td>
<td>Therapy (time-unlimited)</td>
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<td>Hannaford et al50</td>
<td>35 male inpatients 25-60 y</td>
<td>Running</td>
<td>8 wk</td>
<td>ZSDRS</td>
<td>1.5-mile test</td>
<td>Yes, in running and corrective therapy groups</td>
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<td>test</td>
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<td></td>
<td></td>
<td>Wait-list</td>
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<tr>
<td>Kavanagh et al51</td>
<td>44 post-MI male patients</td>
<td>Jogging</td>
<td>2-4 y</td>
<td>MMPI &gt; 70</td>
<td>Bicycle test</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Klein et al52</td>
<td>74 outpatients mean=29 y</td>
<td>Running</td>
<td>12 wk</td>
<td>Research diagnostic criteria SCL-90</td>
<td>None</td>
<td>Yes</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relaxation therapy</td>
<td></td>
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<tr>
<td>Martinsen et al53</td>
<td>43 inpatients 17-60 y</td>
<td>Aerobic</td>
<td>9 wk</td>
<td>BDI</td>
<td>Bicycle test</td>
<td>Yes, only in aerobic group with &gt;15% fitness improvement</td>
<td>Yes, only in aerobic group with &gt;15% improvement</td>
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<tr>
<td></td>
<td></td>
<td>Occupational therapy</td>
<td></td>
<td>Depressive Analogue Scale</td>
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</table>

Experimental studies of exercise and depressed adults
Exercise Training as an Alternative Treatment for Depression

Exercise vs Medication

To our knowledge, only two studies have examined the combined effects of exercise and antidepressant medication on depressive symptoms. In the first, Martinsen et al examined the effects of exercise training in 49 hospitalized patients meeting the DSM-III-R criteria for major depression. Patients were randomly assigned to either aerobic exercise (walking/jogging) or a control group (occupational therapy) 3 times per week for 9 weeks. Approximately half the subjects in each group received medication. A significant increase in aerobic capacity was found for the aerobic condition, whereas the control group did not change. Both groups had achieved significant reductions in depression scores, though the reductions in the training group were significantly greater than those in the control group. Nine patients in the training group and 14 in the control group received tricyclic antidepressants in doses from 50 to 150 mg/d. According to preliminary results, the combination of exercise and tricyclic antidepressants was no more effective than exercise alone.

The second study compared 8 weeks of aerobic versus non-aerobic exercise in a group of 99 inpatients with DSM-III-R diagnoses of major depression, dysthymia, or atypical depression. Fourteen patients in each group received tricyclic antidepressants during the study. A nonsignificant trend was found: a combined regimen of exercise and antidepressant pharmacotherapy was superior to exercise alone.

As yet, no published study of depressed subjects has compared the effects of exercise with those of pharmacotherapy. However, researchers at Duke University Medical Center have set

<table>
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<tr>
<th>Author</th>
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<th>Depression measures</th>
<th>Fitness measures</th>
<th>Improved mood</th>
<th>Improved fitness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Martinsen et al</td>
<td>98 inpatients</td>
<td>Running, Weight lifting</td>
<td>8 wk</td>
<td>MADRS</td>
<td>Bicycle test</td>
<td>Yes, in both groups</td>
<td>Yes, only in running group</td>
</tr>
<tr>
<td>McCann and Holmes</td>
<td>43 female students</td>
<td>Aerobic, Relaxation, No treatment</td>
<td>10 wk</td>
<td>BDI &gt; 11</td>
<td>12-minute run</td>
<td>Yes, only in aerobic group</td>
<td>Yes, only in aerobic group</td>
</tr>
<tr>
<td>McNeil et al</td>
<td>30 older adults</td>
<td>Walking, Social contact, Wait-list</td>
<td>6 wk</td>
<td>BDI &gt; 12 &lt; 24</td>
<td>12-minute walk</td>
<td>Yes, only in walking and social group</td>
<td>Yes, only in walking group</td>
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<tr>
<td>Sexton et al</td>
<td>52 subjects</td>
<td>Walking, Jogging</td>
<td>8 wk</td>
<td>SCL-90</td>
<td>Bicycle test</td>
<td>Yes, in both groups</td>
<td>Yes, only in jogging group</td>
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<tr>
<td>Sime</td>
<td>15 subjects</td>
<td>Aerobic exercise</td>
<td>10 wk</td>
<td>BDI</td>
<td>Bicycle test</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Steptoe et al</td>
<td>53 subjects</td>
<td>Walking/jogging, Strength/ flexibility</td>
<td>10 wk</td>
<td>POMS</td>
<td>Predicted Vo2max</td>
<td>Yes, in both groups</td>
<td>Yes</td>
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<tr>
<td>Veale et al</td>
<td>124 subjects</td>
<td>Jogging, Relaxation/yoga</td>
<td>12 wk</td>
<td>Clinical interview schedule</td>
<td>Bicycle test</td>
<td>Yes, in jogging and yoga groups</td>
<td>Yes, in jogging and yoga groups</td>
</tr>
<tr>
<td>Williams and Getty</td>
<td>41 college males</td>
<td>Jogging, aerobic dance, Nonaerobic Control</td>
<td>10 wk</td>
<td>ZSRDS, POMS</td>
<td>Recovery heart rate</td>
<td>Yes, for all groups</td>
<td>Yes, only for aerobic group</td>
</tr>
</tbody>
</table>

MMPI, Minnesota Multiphasic Depression Inventory; ZSRDS, Zung Self-Rating Depression Scale; BDI, Beck Depression Inventory; HRS-D, Hamilton Rating Scale for Depression; CBT, cognitive behavior therapy; SCL-90, Symptom Checklist; MI, myocardial infarction; MADRS, Montgomery-Asberg Depression Rating Scale; POMS, Profile of Mood States
out to examine the comparative antidepressant efficacy of three randomly assigned treatments for 150 adults aged 50 years and older with major depression: (1) aerobic exercise training alone, (2) standard pharmacotherapy with sertraline hydrochloride (Zoloft), and (3) a combination of these. All subjects are being evaluated before treatment, at 4 months, and 6 months after completing the program to assess the long-term effects of the interventions. Preliminary impressions of this study are that all three treatments are well tolerated.

Summary of Experimental Studies in Clinical Samples

Most studies concerning the effects of exercise on depression have involved younger samples; therefore, the generalizability of such results among older populations should be interpreted with caution. More experimental studies on older populations are needed. The one study that did include older adults, however, found that participation in physical exercise has antidepressive effects. All reviewed studies consistently indicate that exercise is more effective in treating depression than is no treatment, but that exercise is not significantly different from other forms of treatment including psychotherapy. The degree of improvement in aerobic fitness does not seem related to the extent of improvement in depression, because patients with minimal aerobic gains may exhibit psychological effects similar to those of patients who have achieved large increases in physical fitness.

In addition, more studies are needed to compare exercise training with pharmaceutical approaches in terms of benefits, adverse effects, and costs. With the escalating costs of treating depressive disorders, a need exists to identify cost-effective treatments that can be implemented in large segments of the population and that have the potential to lower the incidence or morbidity of this disorder. If exercise training is found to be as effective as standard medical therapy, then it could be a reasonable alternative therapy for treating depression. This is potentially important because medications may be ineffective in a significant subgroup of patients and, in addition, medications may produce unwanted side effects (ie, nausea, diarrhea, constipation, and so on) that may be particularly pronounced among older adults.

METHODOLOGICAL LIMITATIONS

Although findings consistently link exercise with reduced depression, many of the studies reviewed contain potential methodological problems. Study design issues include random assignment, exercise prescription, fitness evaluation, and psychological measurement.

Random Assignment

Because many of the reviewed studies fail to randomly assign subjects into experimental and control conditions, it is difficult to determine whether exercise improves psychological functioning or whether exercisers are more likely to respond with improvement than are nonexercisers. Random assignment of subjects to either an exercise or appropriate control conditions can address these issues. Absence of a control group makes it difficult to determine the extent to which extraneous factors (eg, the passage of time, regression to the mean) may be responsible for reductions in scores measuring depressive symptoms. The question of what constitutes an appropriate control group is important. Controls for social interaction, attention, social support, or self-mastery are often considered.

Exercise Prescription

The exercise training regimen is also an important consideration for research design. Exercise programs can vary significantly in terms of intensity, duration, and frequency of exercise. An aerobic exercise program should include adequate frequency, duration, and intensity to produce a cardiovascular training effect. In general, the American College of Sports Medicine guidelines suggest that a minimum of 8 to 12 weeks of exercise should be used; among the elderly, somewhat longer programs may be needed to produce a training effect.

Fitness Evaluation

Adequate evaluation of aerobic fitness is also an important methodological issue to document improvement and form a basis for exercise prescription. There are a variety of methods to estimate aerobic fitness, and no one method is optimal for all purposes. Questionnaires that assess a subject’s physical activity patterns have been used as measures of physical fitness, and including such instruments as the 7-Day Recall of Physical Activity, Minnesota Leisure-Time Activity Questionnaire, and the Tecumseh Physical Activity Questionnaire. However, even if subjects accurately report their exercise habits, self-reported activity levels are not necessarily a precise measure of aerobic capacity. The most accurate measure of aerobic fitness is typically obtained from exercise stress testing. Submaximal oxygen consumption ($V_{O2}$) exercise tests require the subjects to exercise to a specified endpoint below their maximal level (eg, 85% of age-predicted maximum heart rate). However, submaximal tests are less accurate at estimating $V_{O2}$ than are maximal tests. Ideally, the most accurate measure of aerobic fitness is the maximal exercise test on a treadmill or bicycle ergometer. This test must be performed under adequate supervision following the American College of Sports Medicine guidelines for exercise testing.

Psychological Measurement

Instruments used to determine depression include both self-report questionnaires and structured interviews. The type of instrument employed will depend in part on how the researcher views depression as well as on the primary purpose of the research. The four self-report scales used most commonly include the General Health Questionnaire, the Center for Epidemiological Studies-Depression Scale, the BDI, and the Zung Self-Rating Depression Scale. Self-report scales are useful in identifying potentially depressed patients; however, because these questionnaires identify patients as “depressed” when they only have some symptoms (but not the disorder...
itself), practitioners should not rely exclusively on self-report inventories to make a diagnosis of major depression.

Structured interviews commonly completed by the practitioner include the Hamilton Rating Scale for Depression, the Montgomery-Asberg Depression Rating Scale, and the Schedule for Affective Disorders and Schizophrenia. These may be more sensitive to improvement in the course of treatment and may have slightly greater specificity than do self-reports in detecting depression. For example, one strength of using clinical interview methods with older adults is that these techniques are better able to distinguish depression from other disorders often associated with depressive symptoms (eg, anxiety disorders). Clinical interview-based methods for assessing depression have rarely been used to examine depression as it relates to physical activity in older adults. However, the National Institutes of Health consensus panel on the diagnosis and treatment of depression concluded that because there is no single test for determining depressive disorders, a clinical assessment is essential for the accurate diagnosis of depression. Ideally, researchers should use both a structured interview and a self-report measure to accurately define depressive disorders.

MECHANISMS

Exercise appears to be associated with a decrease in depressive symptoms. However, if exercise improves psychological functioning, it is important to examine the possible mechanisms underlying this association. Both biological and psychological mechanisms have been considered as possible explanations for the effect of exercise on depression.

Biological Mechanisms

One biological theory states that increases in body temperature due to exercise result in short-term tranquilizing effects. This theory is based on the fact that temperature changes in the brain stem result in decreased muscle spindle activity and synchronized electrical activity in the cerebral cortex, causing a more relaxed state. According to a second biological theory, regular exercise facilitates stress adaptation because an increase in adrenal activity increases steroid reserves, which are then available to counter stress. A third biological theory suggests that exercise enhances the neurotransmission of norepinephrine, serotonin, and dopamine, resulting in improved mood. Finally, a popular biological theory posits that psychological improvements resulting from exercise are due to the release of endogenous chemicals (eg, endorphins and enkephalins).

Psychological Mechanisms

Many psychological theories also have been offered to explain improvements resulting from exercise. According to one theory, improved physical fitness provides individuals with a sense of mastery, control, and self-efficacy. Another theory states that exercise provides distraction, diversion, or time out from unpleasant cognitions, emotions, and behaviors. A third theory states that exercise and anxiety have similar physical symptoms including increased heart rate, blood pressure, and sweating. Because anxiety is also associated with emotional as well as physical distress, the absence of emotional distress in exercise results in improved psychological functioning. A final theory is that the substantial social reinforcement experienced by those who exercise may lead to improved psychological states.

Until recently, researchers have not considered the possibility that many positive results accrue because of the psychological gains experienced from pursuing fitness rather than gains attributable to physical fitness. The expectation that exercise will be beneficial for one’s health and longevity influences subjective perception, and thus may lead to a sense of achievement and fulfillment. In other words, the perception of fitness may be more closely associated with improvements in functioning than is an actual state of fitness. For example, King et al found that perceived fitness was more closely associated with improvements in psychological variables among 120 adults following a 6-month exercise program than were measures of actual fitness, as measured by VO2max exercise testing. The authors suggest that perceived health and fitness may also result in an increase in mental and physical health-promoting behaviors.

PRACTICAL CONSIDERATIONS

Given that a significant amount of evidence supports the notion that exercise can improve not only physical health but mental and emotional health, how can a physician best motivate his or her patients to exercise? Primary care providers have a key role within the healthcare system, and should inform their patients about the benefits of exercise in disease prevention, motivating them to participate in an exercise program.

The Exercise Program

The type of exercise program a person should initiate depends on his or her health, level of fitness, and interests, but exercises that use the large muscle groups (eg, jogging, walking, swimming, and bicycling) are best for increasing aerobic fitness. In addition, previously sedentary participants should begin an exercise program slowly. Once the individual begins and has some success with the exercise program, gradual increases can be made in the exercise prescription to make it coincide more closely with the ideal prescription. Many older individuals who wish to participate in regular exercise programs may have limitations. Although older men and women can make significant improvements in aerobic capacity with appropriate training, they are more fragile and may be more susceptible to injury during high-impact aerobic activities. Therefore, emphasis on minimal or non-weight-bearing activities such as cycling, swimming, and floor exercises may be more appropriate.

Goal Setting

Realistic goal setting is another important guideline to follow. Goals are a chief motivating factor, but only when they are attainable. Short-term goals are more realistic in enabling patients to experience early success. Early successes
keep individuals motivated to continue toward their other goals. The physician can play a very important role in keeping the patients’ goals realistic, and act as a facilitator in helping patients meet goals by progressing at a reasonable pace.

EXERCISE SAFETY

The most commonly encountered problem among older adults is musculoskeletal discomfort or injury due to overuse or trauma. Orthopedic injuries occur most often during exercise as a result of added stress on feet, ankles, legs, knees, and lower back associated with jogging, running, and racket sports. Most of these injuries are due to irritations of tendons, ligaments, bones, and sometimes muscles. There is a wide range of susceptibility to such injuries and it is difficult to predict who will have problems as intensity and the amount of exercise increase. Risk does become greater, however, with advancing age, history of previous injury, overuse, and substantial obesity. Injury resulting from exercise training often deters one from continuing an exercise program. Preventive strategies include involvement in non-weight-bearing activities such as swimming, stationary cycling, or rowing, as well as substituting brisk walking or hiking for jogging.

FUTURE DIRECTIONS

Although all published studies on clinically depressed patients indicate that exercise is associated with an antidepressive effect, the studies are few—and most suffer from methodological shortcomings. However, it is clear from recent evidence that an increase in aerobic fitness is not a necessary condition for the antidepressive benefits; the important mechanism seems to be participation in exercise itself, not the achievement of fitness.

Including exercise in treatment programs for those with depressive disorders has a number of advantages: it is time and cost effective compared with psychotherapy and drug treatment, there are relatively few side effects compared with drug treatment, and it is potentially useful as a preventive measure of future depressive episodes. Given these advantages, if research continues to show that exercise can prevent or reduce mental health problems, exercise might become the primary treatment of choice. A growing research base might encourage further experimentation with exercise intervention and its potential benefits in alleviating psychological distress.

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7. DHHS Publication No. 93-5051.